Request for Proposal (RFP)
On Turnkey Basis

For

Establishment of Data Centre and provision of IT & Non-IT equipment with requisite software's at Nawaz Sharif Social Security Hospital, Lahore

Punjab Employees Social Security Institute (PESSI)
Government of Punjab

INVITATION TO BID

1. Punjab Employees Social Security Institution (PESSI), Government of the Punjab, Lahore, invites sealed bids from eligible bidders for Establishment of Network System & Supply of Hardware for Nawaz Sharif Social Security Hospital project.

2. Punjab Employees Social Security Institution (PESSI) requests Tender Bids in sealed envelopes on **Turnkey Basis.** Proponents applying for bids should submit **two separate bids/envelopes for Financial Proposal and Technical Proposal.**

3. The Technical Proposal should contain all the bid items without quoting the price and must list firm's clientele, details of past project, resumes/CVs of the engineering team, after-sales service and authorization letters from manufactures, etc. Financial bids of Firms not pre-qualified on Technical basis will not be opened. The selected firms would be responsible for complete execution of the equipment and would hand over it in satisfactory running state within stipulated time.

Sr. No.	Description	Amount in Rs.
01.	**Servers**	
02.	**External Storage Device (SAN)**	
03.	**Tape Library**	
04.	**Computers**	
05.	**Laptops**	
06.	**Printers**	**Rs. 10,000.00**
07.	**Networking**	
08.	**IP Telephony**	
09.	**UPS**	
10.	**Precision Cooling System**	
11.	**Software Licenses**	

November 2010

4. All bids must be accompanied by a call deposit (CDR) of two percent (02%) of total bid amount. The bids along with the CDR must be delivered to the office of the Director IT, Punjab Employees Social Security Institution (PESSI), 3-A, Gulberg V, Lahore on or before 1500 hours on **22th** **November 2010.** The Technical bids will be publicly opened in the Committee Room of Punjab Employees Social Security Institution (PESSI), 3-A, Gulberg V, Lahore. Pakistan, at 1530 hours on **22th** **November 2010.**

5. Bidders shall submit Bids, which comply with the Bidding Documents. Alternative Bids will not be considered.

6. Punjab Employees Social Security Institution (PESSI), Lahore will not be responsible for any costs or expenses incurred by bidders in connection with the preparation or delivery of bids

7. As authority competent to accept the tender, the Commissioner PESSI reserves the right to accept or reject one or all the tenders without assigning any reason thereof.

8. Failure to supply items within the stipulated time period will invoke penalty as specified in penalty clauses of this document. In addition to that, 02% Call Deposit (CDR) amount will be forfeited and the company will not be allowed to participate in future tenders as well.

9. Execution/installation of the said tendered equipment will be carried out at Lahore.

Saleem Zubair Ahmad
Director IT,
Punjab Employees Social Security Institution (PESSI), Head Office,
3-A, Gulberg V, Lahore
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1. Description of Work

Punjab Employees Social Security Institution (PESSI), invites proposals from companies having a legal presence in Pakistan for the establishment of Data Centre with provision of hardware & software at Nawaz Sharif Social Security Hospital Lahore.

This Request for Proposal (RFP) is being issued to introduce technology through PESSI in Nawaz Sharif Social Security Hospital to speed-up the health process to directly or indirectly help citizens of Pakistan. Project aims to enhance the current IT infrastructure at Nawaz Sharif Social Security Hospital, to improve internal communications, facilitate speedy delivery of services to patients and provide appropriate, transparent and speedy access of information.

2 Scope of Work

PESSI is looking towards building a flexible and responsive centralized data center at Nawaz Sharif Social Security Hospital, Lahore that will unify computing resources, simplify workload management, and automate high availability and disaster recovery. Scope of work includes:

- Establishment of centralized Data Centre that includes provision of Non-IT equipment etc.
- Provision of state of the art IT hardware (includes computing, routing, switching etc) with requisite licensed software's.
- Training of PESSI technical team on delivered hardware &

  software. Support Services.

3 General Terms & Conditions

- Bids may be submitted to undersigned in a **SEALED ENVELOPE** at the address given below latest by **22th November 2010. by 1500:00 pm.** The technical bids will be opened on the same date at 15:30 pm. Proposals shall be delivered by hand or courier. PROPOSALS RECEIVED BY FAX OR EMAIL SHALL NOT BE ACCEPTED. PROPOSALS RECEIVED AFTER THE GIVEN DATE & TIME WILL NOT BE ACCEPTABLE. ANY QUERY/CLARIFICATION REGARDING RFP SHOULD REACH UNDERSIGNED WITHIN THREE WORKING DAYS OF PUBLISHINING THIS RFP. HOWEVER RFP WILL NOT BE REVISED IN ANY CASE.

Saleem Zubair Ahmad
Director IT,
Punjab Employees Social Security Institution (PESSI)
Address: **Head Office, 3-A, Gulberg V,**
Telephone: **042-99263129**
Fax: **042-99263098**

- A bid bond (in the shape of bank draft/pay order), in the name of Punjab Employees Social Security Institute, Government of Punjab, equivalent to 2% of the total cost of bid should be submitted along with the proposal in SEPARATE SEALED ENVELOPE with BID BOND written on it.
- Bidders will be required to attach a letter with bid document, duly acknowledged/signed by respective PRINCIPAL that their partner/partner (s) will deliver & install the requisite hardware & software within given timelines, and also fulfill the scope of work as per contract agreement and any violation will be considered fraud that might be result in other potential remedies, blacklisting from participation in future procurements in public sector etc.
- Lead bidder should be a company/firm having legal presence in Pakistan.

- Alternative solutions shall not be considered.
- Responding Organizations MUST address SOLUTION ON TUNRNKEY BASES. No partial bidding of equipment from any single category is allowed.
- All proposal and price shall remain valid for a period of 120 days from the date of the submission of the proposal. However, the responding organizations are encouraged to state a longer period of validity for the proposal.
- The RO shall be responsible for the payment of any duties/taxes etc. that are imposed by the GoP during the currency of the project.
- The responding organizations are hereby informed that the Government shall deduct tax at the rate prescribed under the tax laws of Pakistan, from all payments for the equipment including hardware and software supplied by the responding organization who signs a contract with the Government.
- At the time of last payment milestone, the vendor shall be required to deposit Performance Guarantee in the form of a Bank Guarantee, equivalent to ten percent (10%) of the contract value. This Bank Guarantee shall be issued by a Scheduled Bank operating in Pakistan. Including the fulfillment of all other contractual obligations, this guarantee must remain valid from the date of issue, until the expiry of warranty period. Government may cash the Performance Bond/Bank Guarantee if the responding organization breaches any of its obligations under the contract, including slippages in the committed schedules.
- The attention of prospective Bidders is drawn to (i) the fact that they will be required to certify in their bids that all Equipment is delivered by the Bidder as per contract and (ii) that violations are considered fraud, which is, among other remedies, punishable by potential blacklisting from participation in future procurements
- RO should provide three (03) year comprehensive warranty against the equipment quoted, including replacement of parts and onsite support.
- RO should be responsible to provide comprehensive training to PESSI technical team on the delivered hardware & software.
- The responding organization (RO) must be authorized Partner/Distributor, of THE ORIGINAL MANUFACTURER, in Pakistan. No refurbished/used equipment will be delivered by successful bidder.
- The equipment should be supplied through verifiable distribution channels. Along with the delivery, RO should submit a certificate from manufacturer for the verification of distribution channel.
- Successful bidder will be required to deliver spare parts of EVERY critical equipment (i.e. blade chassis, chassis of switch with critical modules etc) at the time of initial delivery at project site for the smooth availability of IT infrastructure, failing to do so may result in delay in financial payments as per project payment milestones.
- Successful bidder will be responsible to emboss PESSI name on each hardware component.
- Responding organizations may only quote branded equipment in this tender. Local brands will not be considered.
- 1) The RO will provide managed support services for the equipment and OS platforms. This may be renewed on yearly basis.
- 2) The RO will provide on-site for support of the system for a period of one year.
- The proposed equipment must comply with the minimum specifications mentioned at Annexure-I. In the absence of compliance statement, the proposal will be automatically rejected.

- RO should have adequate support capabilities. Support experience with Public Sector Government organizations on projects of similar nature should be clearly mentioned in proposal. RO should also clearly provide list of technical staff for onsite technical support along-with problem solution timelines as per the following format along-with their bid, failing to not meet timelines may result in delay in financial payments as well as blacklisting from Public sector organizations etc:

S#	Items	Complaint / warranty	Response time (in hours)	Resolution time (in hours)	Contact person name, E-mail & Mobile No.

- RO should clearly mention the duration of delivery & installation of equipment in bid document.
- The quantities of the required hardware may be increased or decreased by PESSI.
- The Punjab Employees Social Security Institution reserves the right not to accept the lowest or any proposal and to annul the bidding process without assigning any reason whatsoever.
- Prices may be quoted in PKR (Pakistan Rupees). Format of Financial proposal is placed at Annexure-II. Bidders must follow the same format.
- Bidder must provide an affidavit on judicial paper, that the bidding firm never had been blacklisted by any Government or Semi-Government Organization. As per format at annexure D

Penalty Clause

The contract to be executed between PESSI and the selected vendor will contain penalty clauses for delay in the implementation schedule as well as failure to comply with the provision of providing the required services during the post-approval phase.

FORMAT FOR THE SUBMISSION OF PROPOSAL:

Proposal may be submitted in the following format:

1. 3 x copies of Technical proposal along-with softcopy (in CD).
2. 1 x Bid Bond (separate sealed envelope)
3. 1 x financial proposal (separate sealed envelope)

INITIAL SCREENING CRITERIA:

The Technical evaluation of RO (s) will be done on the basis of the following parameters:

- Lead RO should be a Pakistani IT company or a multinational corporation operating in Pakistan through a branch office.
- The lead RO has been in the IT business for at least 3 years.
- Lead RO should have an average annual turnover of Rs. Thirty (30) millions for the last three (3) years.
- RO or Lead bidder should have at least twenty full time relevant technical resources for last one year.

- RO must have successfully completed at least five similar projects in size, worth Rs. 30 Millions in public sector.
- RO or Lead bidder has done three project similar in nature (or at least 50% similar in nature).
- Provided documentary proves of aforementioned information, along-with photo copies of Income Statement or Annual financial reports, National Tax Numbers and Sales Tax Registration Numbers etc as part of bid document.

DETAILED TECHNICAL EVALUATION CRITERIA:

Detailed technical evaluation will be done for those firms, who qualify the initial screening criteria. Tender award committee of PESSI will make the detailed technical evaluation based on the parameters given in this proposal. Ratings for the Detailed Technical Evaluation will be as follows:

- Relevant Experience of Responding Organization(s) : 20%
- Relevant Experience of Permanent Staff: 20%
- Support Capabilities of Responding Organization: 30%
- Solution proposed as per RFP requirement (presentation required): 30%

NOTE: Bidders (who will qualify initial technical evaluation/screening criteria) will be asked to arrange technical presentation of solution proposed.

FINANCIAL EVALUATION CRITERIA:

Financial bids of firms who score at least 70% in the technical evaluation (as a whole) will be opened before the representatives who wish to attend the tender opening.

NOTE: Decision of PESSI tender award committee to finalize the successful bidder will in no case be challengeable in any forum.

RELEVANT EXPERIENCE

Responding Organizations must demonstrate relevant experience in projects with similar nature, industry sector, size and geography. Responding organization should provide the details of experience in similar projects according to the following format. An ideal reference will include projects of similar nature in the government sector with same size and geography (i.e., South Asia). The number of references is restricted to five.

Sr. #	Nature of Project	Total Value PKR (Mil)	Geography	Size of Project	Name of the Project, Customer, Contact person & Contact Details

TE
CHNOLOGY ROADMAP

Responding Organization to clearly mention the roadmap for services, that are quoted as part of the total solution. A detailed chapter covering at least the following:

- Support of various IEEE standards
- Technology refresh (strategy for the renewal and/or upgrade of technology employed at different times during the lifecycle of the project)
- Investment Robustness (avenues to safeguard investment in technology, e.g., using industry standards, modularizing the system, upgradeability and scalability)

Any other supporting documents, graphs or charts which describe the technology roadmap of hardware/software platform used for applications and equipment quoted may also be provided.

STAFF ASSIGNED TO THE PROJECT

Responding Organizations are required to name and provide resumes of at least the planned project manager, and respective technical team members, along-with a list of persons deputed for this project with their roles/responsibilities. Particular focus should be on core skills set required for implementation of project of this nature.

PESSI requires the resumes of staff, assigned to this project as per format given in Annexure-III, in the following three categories.

1. Total Staff assigned to the project (Please specify role of each person, as per minimum requirements mentioned above)

2. Total Staff assigned for Project Implementation.
3. Total Staff assigned to the project for Support purposes
4. Total staff assigned to the project for Training purposes

IMPLEMENTATION & PAYMENT SCHEDULE:

Milestone Time Period Payment

S. No	Milestone	Time Period	Payment
1.	Signing of contract	One week from issuance of LOI	10 % Mobilization Advance (Against Bank Guarantee)
2.	Delivery (of hardware, communication, environmental system and software's etc) and training of PESSI technical team	Four TO SIX weeks from date of signing of contract	70%
3.	Installation & Configuration of the hardware	Two weeks from supply of hardware / licensed software	10%
4.	Submission of Performance Guarantee at PESSI.	One week after installation and configuration. Performance Guarantee should be valid for three years from the date of supply of hardware / licensed software. All the contractual obligations must be completed during this period; otherwise the duration of performance guarantee will be increased accordingly.	10% on submission of Performance Guarantee
5	End of Warranty Period	Three (03) Months after the end of warranty period	Release of Performance Guarantee

Infrastructure Functionality Required

Converged Infrastructure/ Failover Mechanism:

Blade System should support Power Manager, which allows users to monitor and report standard feature of power usage and thermal information, track actual power consumption over time to aid in datacenter decision making, Power Manager should capable also monitors storage and third-party equipment with the use of intelligent PDUs.

Blade Servers should support Solid state drive along with SAS drives

Blade System should support Predictive Failure Analysis on critical components on the blades.

Blade System should capable to do automate failover and handle pools of up to one or multiple blade chassis.(if not the built-in feature of the system additional software should be mentioned separately). Blade system should support Moving Virtual MAC addresses (VMAC) to another slot requires, Automated or manually and integrated with resource pooling.

Blade System should support assigning Ethernet MAC and Fiber Channel WWN addresses to the Blade system slots in such a way that any blades plugged into those slots will take on the assigned addresses. Manually or automated

Blade System should support either NPIV or full-fabric Fiber Channel; supports switch stacking for network simplification.

Blade system should support Single or multi login across multiple blade system

Blade System should support and delivers extreme flexibility when it comes to blade expansion, Blade System can expand the blade in the future if an application requires
Blade system should offered extreme flexibility with local storage, the Storage & I/O Expansion Module, plus iSCSI or Fiber Channel external SAN.

All the infrastructure software (for Blade Chassis & Storage) should be GUI enabled

In case of One blade Chassis Failure , Second Blade Chassis should remain connected to SAN/iSCSI for continuous operation.

The Infrastructure Software should be able to create a flexible, highly available, Manageable and centralized architecture

Annexure-I

CATEGORY-01: COMPUTING, STORAGE, ROUTING / SWITCHING & INFRASTRUCTURE

Minimum Hardware Base Line

Note: 1. Vendors are requested to come up with equivalent or higher but justifiable configurations 2.

Sr. #	Item description	Required Specification IBM/DELL/HP or Equivalent	QTY
1	Blade Chassis	Blade Chassis form factor as per manufacturer standard	2
		Should be able to support at least 14 (2 Socket) blade servers or higher	
		Minimum 8 I/O Slots or higher (any I/O fabric)	
		Redundant Onboard Blade Chassis Administration Modules	
		No Keyboard	
		No Mouse	
		Internal / External DVD-writer Drive , 8x Max Speed, USB Connection (with RAM)	
		Rack rails	
		Integrated KVM	
		Redundant Power Supply	
		Redundant PDU's - as per manufacturer standard	
2	Chassis Integrated Gigabit Switch	16 ports 10/100/1000BASE-T auto-sensing Gigabit Ethernet switching ports or above	4
		4 external fixed 10/100/1000Mb Gigabit Ethernet RJ-45 ports or above	
3	Internal/External FC SAN Switches / iSCSI SAN Switches	All internal Blades shall be connected via HBA with SAN in case of FC solution. iSCSI switches should connect all the internal blades with Controller of Storage	4
		As per vendor Solution	
4	Database Servers (to be Installed in blade chassis)	2 x Intel Xeon X5620, 2.4 Ghz, 12M Cache, Turbo, HT, 1066 MHz	2
		2 x 146GB 10K RPM Serial Attached SCSI 3GBps 2.5-inch Hot Plug Hard Drive (RAID)	

		Dual Port Gigabit NIC	
		32GB Memory in Total	
		Remote assistant card/Remote management functionality	

5	Application Server (to be Installed in blade chassis)	2 x Intel® Xeon® E5620, 2.4Ghz, 12M Cache, Turbo, HT, 1066MHz	2
		2 x 146GB 10K RPM Serial Attached SCSI 3GBps 2.5-inch Hot Plug Hard Drive	
		Dual Port Gigabit NIC	
		16GB Memory in Total	
		Remote assistant card/Remote management functionality	
6	Blade Server for Exchange front end (to be integrated in blade chassis)	2 x Intel Xeon E5620 2.40Ghz, 12M Cache, Turbo, HT, 1066MHz	2
		2 x 146GB 10K RPM Serial Attached SCSI 3GBps 2.5-inch Hot Plug Hard Drive	
		Dual Port Gigabit NIC	
		16GB Memory in Total	
		Remote assistant card/Remote management functionality	
7	Blade Server for Exchange Mail box (to be integrated in blade chassis)	Intel Xeon E5620 2.40Ghz, 12M Cache, Turbo, HT, 1066MHz	2
		2 x 146GB 10K RPM Serial Attached SCSI 3GBps 2.5-inch Hot Plug Hard Drive	
		Dual Port Gigabit NIC	
		16GB Memory in Total	
		Remote assistant card/Remote management functionality	
8	Server for Web Service (to be Integrated in blade chassis)	2 x Intel Xeon E5620 2.40Ghz, 12M Cache, Turbo, HT, 1066MHz	2
		2 x 146GB 10K RPM Serial Attached SCSI 3GBps 2.5-inch Hot Plug Hard Drive	
		Dual Port Gigabit NIC	
		8GB Memory in Total	
		Remote assistant card/Remote management functionality	
9	Blade Servers for Domain / DHCP (to be integrated in blade chassis)	2 x Intel Xeon E5620 2.40Ghz, 12M Cache, Turbo, HT, 1066MHz	4
		2 x 146GB 10K RPM Serial Attached SCSI 3GBps 2.5-inch Hot Plug Hard Drive	
		Dual Port Gigabit NIC	
		8GB Memory in Total	
		Remote assistant card/Remote management functionality	

10	Blade Servers for file service (to be integrated in blade chassis)	2 x Intel Xeon E5620 2.40Ghz, 12M Cache, Turbo, HT, 1066MHz	2
		2 x 146GB 10K RPM Serial Attached SCSI 3GBps 2.5-inch Hot Plug Hard Drive	
		Dual Port Gigabit NIC	
		32GB Memory in Total	
		Remote assistant card/Remote management functionality	
11	Blade Server for print service (to be integrated in blade chassis)	1 x Intel Xeon E5620 2.40Ghz, 12M Cache, Turbo, HT, 1066MHz	2
		2 x 146GB 10K RPM Serial Attached SCSI 3GBps 2.5-inch Hot Plug Hard Drive	
		Dual Port Gigabit NIC	
		8GB Memory in Total	
		Remote assistant card/Remote management functionality	
12	Blade Server for Antivirus service (to be integrated in blade chassis)	1 x Intel Xeon E5620 2.40Ghz, 12M Cache, Turbo, HT, 1066MHz	2
		2 x 146GB 10K RPM Serial Attached SCSI 3GBps 2.5-inch Hot Plug Hard Drive	
		Dual Port Gigabit NIC	
		8GB Memory in Total	
		Remote assistant card/Remote management functionality	
13	Blade Server for WSUS service (to be integrated in blade chassis	1 x Intel® Xeon® E5620 2.40Ghz, 12M Cache, Turbo, HT, 1066MHz	2
		2 x 146GB 10K RPM Serial Attached SCSI 3GBps 2.5-inch Hot Plug Hard Drive	
		Dual Port Gigabit NIC	
		8GB Memory in Total	
		Remote assistant card/Remote management functionality	
14	Blade Server as failover node (to be integrated in blade chassis)	2 x Intel Xeon X5650, 2.66Ghz, 12M Cache, Turbo, HT, 1333MHz Bottom of Form	2
		2 x 146GB 10K RPM Serial Attached SCSI 3GBps 2.5-inch Hot Plug Hard Drive	
		Dual Port Gigabit NIC	
		32GB Memory in Total	
		Remote assistant card/Remote management functionality	

15	42U branded Rack with accessories	96-key Server Keyboard with Touch Pad , USB plus PS/2 connections	4
		17FP Rack Console (17" LCD W/ 1U Tray And Rapid Rails; With-Out Keyboard)	
		Shelf For Monitor/Equipment	
		Tray For Mini Keyboard	
		PDU 'S (As per quoted Solution)	
		FAN Kit	

16	External Storage	8 Gbps FC / iSCSI Modular Storage Architecture	1
	SAN Functionality	The array must have enterprise software that will enable online expansion of storage capacity with no downtime or disruption to application, automatic load balancing, clustering, multi-path Input / Output, failover, storage Virtualization and boot from SAN.	
		Storage must be easily upgraded with little or no downtime needed to upgrade Firmware or replace Field Replaceable Units.	
		The performance must scale as additional disks are added. We do not want to be restricted by the controllers and network connections as we add capacity	
		Storage must support Windows, Linux, Unix, Solaris, AIX, HPUX, UAX and other industry standard operating systems including multipathing and load Balancing software.	
		Storage must be presented as a single architecture that can grow on demand without interruption. Scalability upto 90TB required for future.	
		Storage must allow multiple generations of hardware procured over time to work on the same volumes at the same time.	
		Storage must have a shared architecture that provides load balancing across multiple controllers and caches on the same volume at the same time	
		Storage should have the ability to clone a snapshot volume.	
		Storage should have the ability to do an instant restore from a snapshot.	
		Each Controller should have 2 iSCSI port/ 2 FC host ports	
		Dual Redundant Controller. 2GB cache per controller or higher	
		At least 32 x 600GB SAS 15k RPM SAS Drives , Supporting RAID level 0,1, 5, 6, RAID 10) with Hot Spare. Useable after RAID 5 at least 14TB with 4 hot spare drives. OR **Tier 1** - 10TB Raw Storage using 4Gbps FC 15K RPM Disk or 6Gbps SAS 2.0 15K RPM **Tier 2** - 14 TB Raw Storage using 4Gbps SATA 7.2K RPM Disk or 6Gbps Near Line SAS 7.2K RPM Disk	
		Support for replication in future.	
		Online RAID level Migration software must be included	
		Online Volume migration from SAS to FC or Vice Versa.	
17	Data Backup Software	Symantec Backup Exec 2010/networker/Tivoli/HP Open view	1
		Automatic Data backup software with agents for MS Exchange, Oracle, Open Files. (Should have the capability to take data backup online/off-line).	
18	Tape Library	Up to at-least 48 slots	1

		2 x LTO5 6Gb SAS/FC Drive(s)	
		1 x Cleaning Cartridge	
		Tape Media for LTO5, Quantity: 25	
		Connecting SAS Cables, Rack Rails & Accessories	
		SAS 6Gbps HBA card/FC HBA (Based on Proposed Solution)	
19	Backup Server (for Backup Software)	2 x Intel Xeon E5620 2.40Ghz, 12M Cache, Turbo, HT, 1066MHz	1
		2 x 146GB 10K RPM Serial Attached SCSI 3GBps 2.5-inch Hot Plug Hard Drive	
		Dual Port Gigabit NIC	
		8GB Memory in Total	
		Dual Power Supply.	

20	**Desktops for standard usage**	Intel Core i3 Processor 540 (3.06 GHz, 4MB Cache)	260
		Intel Q57 Express Chipset	
		1 GB DDR-3 Memory	
		160GB SATA Hard Drive with Raid 1,0 Support	
		Integrated VGA	
		Integrated Sound	
		Integrated Gigabit Ethernet	
		USB Key Board	
		USB Optical Mouse	
		Minitower Chassis	
		18" LCD or higher Monitor	
		Standard Power Supply	
		Custom Factory Integration and Institute Logo at BIOS	
		Proper BIOS based Locking solution (Manufacturer standard)	
21	**Desktops for professional usage**	Intel Core i5 Processor 650 (3.20 GHz, 4MB Cache)	40
		Intel Q57 Express Chipset	
		1 GB DDR-3 Memory	
		160GB SATA Hard Drive with Raid 1,0 Support	
		Integrated VGA	
		Integrated Sound	
		Integrated Gigabit Ethernet	
		USB Key Board USB Optical Mouse	
		Minitower Chassis	
		18" LCD or higher Monitor	
		Standard Power Supply	
		Custom Factory Integration and Institute Logo at BIOS	

		Proper BIOS based Locking solution (Manufacturer standard)	

22	**Laptops for professional usage**	Intel Core i3 370 Processor (2.4 GHz, 3MB Cache)	10
		Intel HM57 Express Chipset	
		4 GB DDR-3 Memory (2 x 2GB)	
		320GB SATA Hard Drive 7.2K RPM	
		DVD+/- RW Drive	
		14" Wide LED Anti Glare Display	
		Integrated Camera	
		Integrated Gigabit NIC	
		Wireless Network	
		Integrated Graphic Media Accelerator HD	
		Bluetooth Module	
		Finger Print Reader	
		Integrated Audio	
		Network Connector (RJ45) USB ports, Docking connector etc.	
		6-Cell Liyhium lon Primary Battery	
		90W AC adapter Original Carrying Case	
		Customer Factory Integration and Institute Logo at BIOS	
		Proper Locking Solution (As per Manufacturer Standard.	
23	**Laser jet Printers**	Maximum print Speed (black): Up to 35 ppm (Letter) or Higher	30
		Resolution: 1200 x 1200 dpi (printer default) or Higher	
		processor Speed; 400MHz or Higher	
		Maximum Duty cycle: Up to 50,000 pages per month or Higher	
		Standard: 32MB RAM Upgradeable to 160MB RAM or Higher	
		Input trays: 250-sheet covered drawer, 50-sheet multipurpose tray or Higher	
		Output capacity: 150-sheet bin or Higher	

		Media types: Plain, Recycled, light, Heavy, Bond, rough (no Duplex support), Colored, Greeting Card Stock (no Duplex support), Envelopes (supported only from MPF), Label (Paper type), Transparencies (Laser), Letterhead, Preprinted	
		Duplexer: Automatic duplex unit (print both sides)	
		Standard interfaces: Hi-Speed USB 2.0, Parallel IEEE-1284,	
		print languages and fonts: HP PCLR 6 Emulation; 2 bitmapped fonts, Post Script R 3 Emulation; 89 scalable fonts; OCR-A and OCR-B fonts, and code 3 of 9 bar codes	
		Operating Systems (OS) Support: MS Windows 2008 Server, 2003 Server, 2000 Server, NT 4.0, XP 32bit/64 bit, 2000, Microsoft Vista 32bit/64bit.	
		RH Linux 3.0, 4.0, 5.0 WS SuSE Linux 10.x or later. NetWare 3.x, 5.1, 6.0. Macintosh version (OS 9.0 or later and OS X or later)	
		Toner, Ship-With capacity: Up to 6,000-page capacity or Higher	

24	**Network Laser jet Printers**	Maximum print Speed (black): Up to 35 ppm (Letter) or Higher	30
		Resolution: 1200 x 1200 dpi (printer default) or Higher	
		processor Speed; 400MHz or Higher	
		Maximum Duty cycle: Up to 50,000 pages per month or Higher	
		Standard: 32MB RAM Upgradeable 288MB RAM or Higher	
		Standard input trays: 250-sheet covered drawer, 50-sheet multipurpose tray or Higher	
		Standard Output capacity: 150-sheet bin or Higher	
		Media types: Plain, Recycled, light, Heavy, Bond, rough (no Duplex support), Colored, Greeting Card Stock (Automatic Duplex support), Envelopes (supported only from MPF), Label (Paper type), Transparencies (Laser), Letterhead, Preprinted	
		Duplexer: Automatic duplex unit (print both sides)	
		Standard interfaces: Hi-Speed USB 2.0, Parallel IEEE-1284, 10/100 BaseT RJ45 Ethernet port	
		print languages and fonts: HP PCLR 6 Emulation; 2 bitmapped fonts, PostScriptR 3 Emulation; 89 scalable fonts; OCR-A and OCR-B fonts, and code 3 of 9 bar codes	
		Operating Systems (OS) Support: MS Windows 2008 Server, 2003 Server, 2000 Server, NT 4.0, XP 32bit/64 bit, 2000, Microsoft Vista 32bit/64bit. RH Linux 3.0, 4.0, 5.0 WS SuSE Linux 10.x or later. NetWare 3.x, 5.1, 6.0. Macintosh version (OS 9.0 or later and OS X or later)	
		network protocols: TCP/IPv4, IPv6 (DHCP, DNS, 9100, LPR, SNMP, HTTP, IPSec), EtherTalk, Novell NetWare (IPX/SPX), (NDS, Bindery, iPrint), DHCP, BOOTP, SLP, SSDP, Rendezvous (Bonjour), DDNS Lite, WINS, TCP (Port 2000), LPR (Port 515), Raw (Port 9100), IPP Port Printing/Secure- IPP, SNMPv1/2/3, HTTP/HTTPs, Telnet, SMTP (E-mail Notification)	
		Toner, Ship-With capacity: Up to 6,000-page capacity or Higher	

		Digital Copier (Panasonic, Canon, Konica Minolta or equivalent)		
25	**Digital Copier**	Memory	25 6MB	01
		Type	Digital	
		CPM	45 Pages Per Minute	
		Zoom	25%-400%	
		Electric Sorting	Built in	
		Network Printing & Color Scanning	Built in	
		Paper Capacity	1200 Sheets	
		Bypass try	Built in	
		Duplex	Built in	
		Direct USB Printing	Built in	
		Note: also provide the cost of the consumables and per page copy cost		
		Laser Jet Fax Machine (Panasonic, Canon, Konica Minolta or equivalent)		
26		Technology	Laser	01
		Speed	10 Pages/Min	
		Function	(12 cpm copier, Fax)	
		Caller ID	Yes	
		Memory	16MB RAM	
		Printing quality	Laser	
		Transmission Speed	33.6Kbps	
		Zooming	50 to 200%	
		Document Feeder	30 Pages	
		Paper Tray	150 Sheets	

CATEGORY – 02: COMMUNICATION & SURVELLANCE

Requirements Classification

All PESSI requirements given in subsequent sections are classified as Critical. All requirements are necessary to meet business objectives of PESSI and hence any proposed solution should comply with these requirements.

Business Requirements

Technology consolidation

The basic purpose of this exercise is to achieve technology consolidation. Nawaz Sharif Social Security hospital building is having multiple departments spread over 3 floors (Ground, First and Second).

The solution should, offer unified view of Network. However, at the same time the solution should offer flexibility.

Professional Services

All professional services for design & deployment should be approved and performed by principle technology vendor locally in Pakistan with the help of local Certified Technology Partner (CTP). Specify the local staff available from principle vendor for

- Quality Assurance
- Project management
- Design
- Deployment
- Maintenance services

The principle technology vendor should have certified local partners with support of the underlying infrastructure (IP Telephony, Network etc) at each call center location. Clearly identify local partners at each location with

- Certified network engineers
- Available stock of network infrastructure spare parts

The core solution may be deployed by principle vendor or certified technology partner (CTP). In case the services are also provided by CTP, the CTP should have

- Experience of deployment across the region
- carrier grade reference customers in the region

Licensing Model

The respondent should clearly specify licensing methodology for all components with licensing limitations. This will be separately marked during evaluation to judge total cost of ownership to determine long term value of the financial proposal.

Capacity Requirements

Current requirements

PESSI is looking at following capacity for various systems as required by their licensing model:

Number of Network nodes: 300

Expansion Considerations

The respondent should design the solution keeping in view below mentioned expansion considerations. These consideration apply to system technical capability and not to hardware or licensing limitation unless explicitly state. PESSI would proceed with additional hardware and licenses as and when required.

- The core solution should not have any technical limitation with respect to system capacity. This will protect the investment against future expansion.
- The system should be able to scale to additional hardware and licenses.

Functional/Operational Requirements

The new solution should fulfil extensive set of requirements as discussed in detail in subsequent chapters. Below is a brief outline of major requirements. For further explanation on each of the following refer to the hardware table

- Firewall
- Intrusion Prevention System
- Access Control Solution
- LAN Core Switch
- LAN Access Switch
- WAN/Edge/P STN Router
- Wireless LAN Controller
- Wireless Access Point
- IP Telephony

REQUIRED PASSIVE LAN

Sr. No.	**Specification Description** (systimax, 3M, Clipsal, Molax or equvillent/**only European ,American, Australian Brands would be considered)**	**QTY ***
1	Fiber Optic Cable Outdoor 6 Core Multimode 50/125 microns per running feet	3,000
2	24 Port Fiber Optic Patch Panel SC Multimode	2
3	6 Port Fiber Optic Patch Panel SC Multimode	8
4	SC Pigtails	96
5	Fiber Multimode Patch Cord	16
6	CAT6 UTP Cable (Roll of 305 meter)	70
7	CAT6 UTP Patch Cord 1 meter	361
8	CAT6 UTP Patch Cord 2 meter	361
9	CAT6 48 Port Patch Panel Loaded	9
10	Dual Information Outlet with backbox	150
11	Single Information Outlet with backbox	61
12	42U Cabinet with Fans and 8 x Power sockets local	1
13	27U Cabinet with 2 Fans and 2 x Clipsal PDU (4 port each)	8
14	Duct 16 x 38 mm per running feet	3,000
15	Duct 40 x 40 mm per running feet	
16	Duct 60 x 60 mm per running feet	
17	PVC Pipe 1" with accessories (Sockets, Joints, Bends & Saddles) per running feet	5,000
18	UTP laying charges per running feet	70,000
19	Piping & ducting charges per running feet	8,000
20	UTP termination & testing charges with Fluke Tester Report	361
21	Systems Integration & Commissioning Charges	1
22	Fiber pulling/laying Charges per running feet	3,000
23	Fiber Splicing Charges per core	96
*** Note: Required quantities may be increased / decreased. Payment will be made as per actual usage.**		

Required Local Area Network (ACTIVE EQUIPMENT)			
S. #	**ITEM**	**SPECIFICATIONS**	**QTY**
1	**Firewall**	State full firewall with application and protocol inspection engines. Throughput should be at least 650 Mbps. VPN throughput should be at least 325 Mbps. Concurrent sessions should be at-least 400,000. IPSEC VPN peers up to 5000. Should be having at least 4 Gigabit Ethernet and 1 x Fast Ethernet Interfaces. Virtual Interfaces (VLANs) support up to 200. VPN Clustering and Load Balancing support. High availability feature. Should integrate with AAA services through RADIUS and/or TACACS+. Should support routing protocols like OSPF & Transparent module static routing. Provide protection from Denial of Service attacks. Integrated Anti-X services including: Antivirus, antispyware, file blocking, anti- spam, anti phishing, URL blocking and filtering, and content filtering. **Must include 3 years of subscription service.**	1
2	**Intrusion Prevention System**	Performance should be at least 2 Gbps. Should have separate monitoring and managing interfaces. Should have UTP based managing interface. Extensive protocol monitoring - All major TCP/IP protocols are to be monitored, including IP, ICMP, TCP, UDP, also state-fully decode application layer protocols such as FTP, SMTP, HTTP, DNS, RPC, NetBIOS, NNTP, Telnet, and peer-to-peer (P2P). Should respond immediately to stop attacks. Intelligent threat investigation capability. P2P / file sharing detection techniques capability. Support for 802.1 q traffic analysis. Secure communication - IP Security (IPSec) or Secure Sockets Layer (SSL) between sensor and management console. Administration via Web user interface using HTTPS, Command-line interface (CLI) (console), CLI (Telnet or SSH) & enterprise network management tool	1

3	**Access Control Solution**	Should be a highly scalable, high-performance access control server that operates as a centralized RADIUS or TACACS+ server. It should enforce a uniform security policy for all users regardless of how they access the network. Should have a central database for all user accounts, centralizes the control of all user privileges and distributes them to hundreds or thousands of access points throughout the network. Should have accounting capability. The device should have a web-based user interface which should simplify and distribute configuration for user profiles, group profiles and server configuration. The server should support large networked environments with support for redundant servers, remote databases, and database replication and backup services. • The server should be able to synchronize with remote database like Microsoft Active directory etc. via secure method • The server should support Lightweight Directory Access Protocol (LDAP) authentication, authentication of user profiles stored in directories from leading directory vendors, including Sun, Novell, and Microsoft • Should support different access levels for different administrators-and should have the ability to group network devices-enable easier control and maximum flexibility to facilitate enforcement and changes of security policy	1
		administration over all the devices in a network • Server should offer token server support for any OTP vendor that provides an RFC-compliant RADIUS interface (such as RSA, PassGo, Secure Computing, ActiveCard, Vasco, or CryptoCard) • Should provide dynamic quotas for time-of-day, network use, number of logged sessions, and day-of-week access restrictions • Should support administrator password policy and should provide a mechanism to enforce a configurable minimum password length and mix of characters (upper/lower case, numeric, punctuation) • Should support administrator password policy and should provide a mechanism to enforce a configurable minimum password length and mix of characters (upper/lower case, numeric, punctuation) • Should display password history for administrators and should prevent administrators from reusing passwords • Syslog support and should provide the native syslog support to log data out of server. • Should have support of Protected Extensible Authentication Protocol (PEAP) with Extensible Authentication Protocol Transport Layer Security (EAP-TLS)	

4	**Core Switch**	Minimum 6 slot chassis. Line card slot minimum speed 48 Gbps. Minimum 48 x 10/100/1000 Ethernet ports, Minimum 24 GigE (SFP) Ethernet ports. Up to 24Gbps bandwidth per slot with future scalability. 280 Gbps of system bandwidth capacity. 225 Mpps of forwarding rate. Should provide enough capacity to forward wire-rate, nonblocking 250 mpps for IPv4 and 125 mpps for IPv6, and supports up to 8 switching modules. Supports Layer 2 (MAC), Layer 3 (IP address), and Layer 4 (TCP/UDP port) switching. Provides automated switch and router neighbor discovery. Authentication (MDA) allow any vendor's IP phone with an IEEE 802. 1x supplicant and a single host behind the IP phone to independently authenticate into the network. Support 802. 1x for Identity-Based Network Services. Supporting 802. 1x Inaccessible Authentication Bypass. Supporting 802. 1x Unidirectional Controlled Port that allows the Wake-on-LAN (WoL) magic packets to reach a workstation attached to an unauthorized 802. 1x switch port. Provides QoS for both Layer 2 class of service (CoS) and Layer 3 type of service (ToS), traffic shaping, sharing, policing, and congestion avoidance with Dynamic Buffer Limiting (DBL). SSO-Aware Hot Standby Router Protocol (HSRP). Port Security on trunk port. Per-VLAN Spanning Tree Plus (PVST+) and Per-VLAN Rapid Spanning Tree (PVRST). Spanning Tree PortFast and PortFast Guard. Spanning Tree UplinkFast and BackboneFast. IP routing protocols: Open Shortest Path First (OSPF), Routing Information Protocol (RIP), and RIPv2. Static Routing. Inter-VLAN Routing capability. ICMP. May work with TACACS+ and RADIUS. Scalability to 4,096 virtual ports (VLAN port instances). Should be having Fault-tolerant, load-sharing power supplies.	2
5	**Access Switch**	Minimum 24 10/100/1000 PoE + 2T/SFP Ethernet uplink ports. Minimum switching bandwidth 3 2Gbps. Minimum Forwarding bandwidth 16Gbps. Maximum Transmission Unit (MTU) Up to 9000 Bytes. Layer 2 switching with intelligent Layer 2-4 services. Power over Ethernet Plus for next generation high power devices. Automatic QoS support. DHCP support. Remote Switch Port Analyzer (RSPAN). Layer 2 Trace route. TFTP support. Port security and VLAN capability.	18

6	**Core Router / PSTN Gateway / Edge Router**	Offer embedded hardware encryption acceleration, voice- and video-capable digital signal processor (DSP) slots, optional firewall, intrusion prevention, call processing, voicemail, and application services. Should support Embedded hardware-based cryptography acceleration (IPSec + SSL). Minimum 01 E1 expandable to 4E1 for PSTN Connectivity. Minimum 3 x 10/100/1000 Ethernet Ports. Should have 2 x External USB 2.0 flash memory slots (Type A). Should have 1 x Service Module slots. Should have minimum 1 x Serial console port. Able to be deployed in high speed WAN environments with concurrent services enabled up to 75 Mbps. Supporting a multi gigabit fabric (MGF) that enables high-bandwidth module-to-module communication without compromising routing performance. Should be having high-performance multi-core processors that can support the growing demands of high-speed WAN connections. QoS, Class-Based Weighted Fair Queuing (CBWFQ), Weighted Random Early Detection (WRED), Hierarchical QoS, Policy-Based Routing (PBR), Performance Routing (PfR), and Network-Based Advanced Routing (NBAR). Ethernet, 802.1q VLAN, Point-to-Point Protocol (PPP), Multilink Point-to-Point Protocol (MLPPP), Frame Relay, Multilink Frame Relay (MLFR) (FR.15 and FR.16), High-Level Data Link Control (HDLC), Serial (RS-232, RS-449, X.21, V.35, and EIA-530), Point-to-Point Protocol over Ethernet (PPPoE), and ATM. IPv4, IPv6, static routes, Open Shortest Path First (OSPF), Enhanced IGRP (EIGRP), Border Gateway Protocol (BGP), BGP Router Reflector, Intermediate System-to-Intermediate System (IS-IS), Multicast Internet Group Management Protocol (IGMPv3) Protocol Independent Multicast sparse mode (PIM SM), PIM Source Specific Multicast (SSM), Distance Vector Multicast Routing Protocol (DVMRP), IPSec, Generic Routing Encapsulation (GRE), Bi-Directional Forwarding Detection (BVD), IPv4-to-IPv6 Multicast, MPLS, L2TPv3, 802.1ag, 802.3ah, L2 and L3 VPN • PSTN gateway router must support SIP, MGCP, H.323 and VXML protocols. • Should support integrated LAN Switching • Secure connectivity: Secure collaborative communications with Group Encrypted Transport VPN, Dynamic Multipoint VPN (DMVPN), or Enhanced Easy VPN • Integrated threat control: Responding to sophisticated network attacks and threats • Identity management: Intelligently protecting endpoints using technologies such as authentication, authorization, and accounting (AAA) and public key infrastructure (PKI)	2

		• Should have support of 2 external Compact Flash slots • Should support USB based console access for management • Should have minimum of 3 on board Gigabit Ethernet Interfaces • Should support services integration and modularity on a single platform performing multiple functions, optimizes raw materials consumption and energy usage • Supported wide range of voice embedded services • Support voice- and video-capable digital signal processor (DSP) slots • Wide range of wired connectivity options such as T 1/E 1, T3/E3, fiber GE • Support EHWIC/HWIC slot provides enhancements to the prior generation's high-speed WAN interface • Support WAN interface cards (WICs), voice interface cards (VICs), and voice/WAN interface cards (VWICs) • support PVDM modules: Providing support for richer density for rich-media voice • Supporting a broad array of signaling and physical network interfaces • Support transcoding, conferencing, and QoS • Standards-certified VoiceXML browser services	
7	**Wireless LAN Controller**	• Should have minimum 8 uplink ports 1 000BaseT, 1 000Base-SX and 1000Base-LH transceiver slots. • Should support a higher density of clients and delivers more efficient roaming • Should Support minimum 50 access points for business-critical wireless services at locations of all sizes • Capable of Separate SSID tunnels to allow both corporate and personal Internet access. • Offers Control and Provisioning of Wireless Access Points (CAPWAP) compliant DTLS encryption to ensure full-line-rate encryption between access points and controllers across remote WAN/LAN links • Support IEEE 802.11a, 802.11b, 802.11g, 802.11d, WMM/802.11e, 802.11h, 802.11n • WPA • RFC 2104 HMAC: Keyed Hashing for Message Authentication • RFC 2406 IPsec	2

		• RFC 2407 Interpretation for ISAKMP • RFC 2408 ISAKMP • RFC 2409 IKE • RFC 2451 ESP CBC-Mode Cipher Algorithms • RFC 3280 Internet X.509 PKI Certificate and CRL Profile • RFC 3602 The AES-CBC Cipher Algorithm and Its Use with IPsec • AES: CBC, CCM, CCMP • DES: DES-CBC, 3DES • SSL and TLS: RC4 128-bit and RSA 1024- and 2048-bit • DTLS: AES-CBC • IPSec: DES-CBC, 3DES, AES-CBC • IEEE 802.1X • RFC 2865 RADIUS Authentication • RFC 3748 Extensible Authentication Protocol • Web-based authentication • TACACS support for management users • SNMP v1, v2c, v3 • Telnet • HTTP • Can be managed through HTTP/HTTPS, Command-line interface: Telnet, Secure Shell (SSH) Protocol, serial port	
8	**Wireless Access Point**	• High Performance Access Point With Layer 3 Functionality • Should be compatible with the following IEEE standards IEEE 802.11a/b/g, IEEE 802.11n, IEEE 802.11h, IEEE 802.11d • support PoE(power over Ethernet) • Manageable console port(RJ-45) • telnet, SSH, http • 802.1 1i, Wi-Fi Protected Access 2 (WPA2), WPA • 802.1X • Advanced Encryption Standards (AES), Temporal Key Integrity Protocol (TKIP)	15

		• Extensible Authentication Protocol-Transport Layer Security (EAP-TLS) • EAP-Tunneled TLS (TTLS) or Microsoft Challenge Handshake Authentication Protocol Version 2 (MSCHAPv2) • Protected EAP (PEAP) v0 or EAP-MSCHAPv2 • Extensible Authentication Protocol-Flexible Authentication via Secure Tunneling (EAP-FAST) • PEAPv1 or EAP-Generic Token Card (GTC) • EAP-Subscriber Identity Module (SIM)	
9	**IP Telephony**		
9.1	**Call Control Server**	• A cost-effective high availability Unified Communications Manager Appliance • Support upto 300 IP communication users • Support a 36/72-GB universal-serial-bus (USB) external Digital Audio Tape (DAT) drive (part number DAT-USB-EXT-72=) or an optional 36/72-GB USB rack-mount DAT drive (part number DAT-USB-RM-72=) • Single Intel Dual Core Xeon E8400 3.0GHz 6M L2 • 2 onboard Ethernet network interface card (NIC) • 10BASE-T cable support 100BASE-TX cable support 1000BASE-T cable support	2
9.2	**Call Control Software**	• Scalable, distributable and highly available enterprise IP telephony call-processing Software. Support Call Control Server. Support Unified Mobility service including single number reach, presence, visual voice mail etc. Provide Unified Communications Manager CDR Analysis and Reporting Tool (CAR). Support SIP, H.323, MGCP, and SCCP Protocol. Native SIP line and trunk side support. Native video telephony support. Support Call Control Discover. Support Analysis Manager. Support Product nodes inventory and grouping. Support Trace setting. Support Trace collection on demand Scheduled trace collection. Support Templates for setting trace levels and trace file server. Support Collection and viewing of system-configuration information. Support System call tracking. Caller ID on Media Gateway Control Protocol (MGCP) foreign exchange office (FXO). Key Expansion Module support. LDAP filtering: Ability to create multiple, custom LDAP filters that can be assigned to one or more synchronous agreements. Support Audio message-waiting indicator (AMWI). Support Automated bandwidth selection. Support Automatic route selection (ARS)	2
9.3	**IP Phones**	• Standard handset that can support for voice communication. Supports two lines and offers a full-duplex speakerphone. Fixed keys for hold, transfer, and conference; tri-color LED line. Support POE. Support network features include IEEE 802.1 p/q tagging and switching. Support 10/100BASE-T Ethernet connection through two RJ-45 ports. Support G.71 1a, G.71 1, G.729a, G.729b, and G.729ab audio-compression codecs.	275
9.4	**IP Phones(Color Screen)**	• Standard handset that can support for voice communication • supports eight lines and offers a full-duplex speakerphone • Support Power Over Ethernet(POE)	25

		• IP address assignment can be statically configured or configured through the DHCP client • 5.6-inch (14 cm) graphical TFT color touch screen display • Support for wideband (G.722 codec, adherence to TIA 920), including handset, headset, and speakerphone • Support G.711a, G.711µ, G.729a, G.729ab, G.722, and iLBC audio compression codecs • Provides direct access to voicemail. • Support 2-port Ethernet switch allows for a direct connection to a 10/100/1000 BASE-T • Supports differentiated services code point (DSCP) and 802. 1Q/p standards. • Built-in support for more than 30 languages	
9.5	**Attendant Console with Phone & Expansion Module**	• Console that can support up to 25 operator clients • Support directory size up to 1,0000 IP Phones • Support for 50 queues with prioritization • Overflow options • Support Directory integration with IPT/UC Call Control server • 5-inch (12.5 cm), high-resolution (320 x 222), graphical monochrome 4-bit grayscale display IP Phone • Support Power Over Ethernet(POE) • Support network features include IEEE 802.1 p/q tagging and switching. • Support 10/100BASE-T Ethernet connection through two RJ-45 ports • Support G.711a, G.711, G.729a, G.729b, and G.729ab audio-compression codecs • 4.3"(inch) high-resolution (480 x 272), graphical monochrome 4-bit grayscale display Expansion Module • Module support 12 physical buttons (24 with page key) Support two Page buttons are used to access each page of 12 buttons and provide status.	1
	Network Management Software	That Should Provide functionality such as information about latest threats, Network Chokes. performance indicators , Traffic Logging etc. for 361 nodes along-with complete management of Network Infrastructure	01

LCD for Display (Panasonic, Sony, Samsung or equivalent International brands)			
Sr. #	**Item**	**Description**	**Qty**
10.5	LCD Displays	56 inch LCDs	4

CATEGORY – 03: **POWER & COOLING INFRASTRUCTURE**

S. No.	Item	Description	Qty
1	Supply, Installation and Commissioning of IT Rack	42 U, 600 mm Wide Racks as per specifications in Annexure-A	4
2	Supply, Installation and Commissioning of Data Center UPS	8 KVA Rack mount UPS as per specifications in Annexure-A	3
3	Supply, Installation and Commissioning of In Row Cooling Units	18.2 KW, Precision cooling units as per specifications in Annexure-A	2
4	Supply, Installation and Commissioning of Chillers	Compatible with InRow Cooling as per specifications in Annexure-A	2
5	Supply, Installation and Commissioning of Chilled Water Piping System	Schedule 40 Piping system including all required valves, gates of required size for connection between Chillers & InRow Cooling Units as per specifications in Annexure-A	1
6	Supply, Installation and Commissioning of Environment Monitoring	IP based monitoring system comprising of Cameras, Temperaure/Humidity Sensors and Integration device, software etc as per specifications in Annexure-A	1
7	System Integration	Installation, Testing & Commissioning of all components including interconnection cables, ducts, labor, software, licenses etc as per specifications in Annexure-A	1 Job
8	Supply, Installation and Commissioning of Block UPS	Central UPS for each block as per specifications in Annexure-B	4
9	Supply, Installation and Commissioning of Electrical Power Distribution System	Power distribution system for each block as per specifications in Annexure-B	4 Jobs

CATEGORY – 04: **LICENSED SOFTWARE'S**

PESSI requirement is qualifying for Academic Discounts, so please quote all the software's with Educational Discounts.

Sr. #	Description	Qty.
1.	Windows Server 2008 Enterprise Edition (Educational)	02
2.	Microsoft Exchange Server 2010 Enterprise Edition (Educational)	02
3.	Windows Server 2008 Standard Edition (Educational)	09
4.	Windows Server CALs (Educational)	320
5.	Exchange Server CALs (Educational)	320
7.	Windows 7 Business Upg (Educational)	320
8.	Microsoft Office Std. 2007 (Educational)	320
9.	Enterprise Antivirus Management Server for managing clients and pushing virus definitions to clients (Server-Client Solution)	01
10.	Antivirus Client Security compatible with the management server	320
11.	Oracle Database 11 g Enterprise Edition	02
12.	Oracle Application Server 1 1g Enterprise Edition	01
13.	Oracle RAC License	01

Le RAC

* Cost of Licenses provided by PESSI will be deducted from Grand total
* Quantity will be finalized at the time of issuing purchase order

Annexure – II

FORMAT OF FINANCIAL PROPOSAL:

S.N.	Item	Quantity	Unit Cost (Rs)	Total Cost (Rs.)
			Total in Pak Rupees	
			GRAND TOTAL IN RUPEES (INCLUSIVE OF ALL TAXES / DUTIES)	

* All the taxes/duties must be included in the total costs. No additional cost will be payable in addition to total cost for the above mentioned items.

ANNEXURE-III

FORMAT FOR RESUMES

1. General Details:

Name	
Date of Joining, in this Company	
Designation in the Company	
Role Assigned in this Project/Activity	
Email	
Mobile #	

2. Education

Sr. No.	Degree	Passing Year	Institution Name	Major/Minor	Division /GPA
1.					
2.					
3.					

3. Certifications

Sr. No.	Name of Certification	Year of obtaining	Date till Certification is Valid	Certification ID / Number
1.				
2.				
3.				

Please provide photocopies of certifications with prescribed resume format. Certifications will not be considered valid without the photocopies.

4. Experience

Total IT Experience (Yrs): _____

Total Experience in Propose Technology (Yrs): _____

DETAILS OF I.T EXPERIENCE:

Sr. No.	Company Name	Designation / Position	Job Description	Experience Years/Months
1.				
2.				
3.				

PROJECTS DETAILS:

Sr. #.	Name of the Project	Role in the Project	Nature & Description of the Project	Tool & Technologies usage in the project	Duration of the Project
1.					
2.					
3.					

ANNEXURE "A"

Bid Specifications

For

Server Room/Data Center

Contents

- **General**
- **Network Critical Physical Infrastructure (NCPI)**
- **Physical Infrastructure Management System (PIMS) (Optional)**
- **Uninterrupted Power System (UPS)**
- **Power Distribution System**
- **IT Server Racks**
- **Precision Cooling System**
- **Security & Environmental Monitoring**
- **Chillers**
- **Chilled Water Piping System**

1. General

This guide specification is written in accordance with the construction specifications institute (CSI) master format. This section must be carefully reviewed and edited by the architect or the engineer to meet the requirements of the project. Coordinate this section with other specification sections in the project manual and with the drawings.

Where reference is made throughout this section to “provide”, “install”, “submit”, etc., it shall mean that the contractor, subcontractor, or contractor of lower tier shall “provide”, “install”, submit”, etc., unless otherwise indicated.

2. Network Critical Physical Infrastructure (NCPI)

Network Critical Physical Infrastructure should be an innovative architecture for using an open, building-block approach and standardized, modular components. It should fully integrate power, cooling, security and environmental management within a rack/row-optimized design.

NCPI should be designed in such a way that it lets us install only what is required today, yet easily scale to meet future demands. It also increases system availability while decreasing design and install time from months to days.

3. Uninterruptible Power System (UPS) A

SUMMARY

1. This specification describes the operation and functionality of a continuous duty, single-phase, solid-state, static Uninterruptible Power System (UPS) hereafter referred to as the UPS.
2. The UPS utilizes double conversion online topology designed to protect electronic equipment by supplying reliable, network-grade power featuring extremely tight voltage and frequency regulation. The UPS also features internal bypass and input power factor correction.
3. The primary sections of the UPS are: input disconnect and filter stage, input PFC power stage, energy storage stage (DC bus capacitor bank), output power stage (inverter), bypass and a battery charger. The control of power module and fault detection logic is microcontroller based. Input disconnect and filter stage contains input backfeed relay (in models with a input wire plug), input filter, transient suppression, battery select transfer relays. Input PFC power stage contains non-isolated power factor correcting AC/DC converters. This converter is capable of full power operation in very wide input voltage range or from a nominal DC battery voltage. The energy storage stage is a split DC bus

capacitor handling seamless transitions from battery to line and vice versa as well as the low and high frequency power stages ripple. The inverter stage operates directly from the DC bus and produces an AC output voltage of 200/208/220/230/240VAC output. The output of UPS is either connected through a bypass relay to the inverter or to the input filtered line. UPS contains a battery charger, which operates from the DC bus.

4. The UPS batteries are modular, hot-swappable, user-replaceable.
5. In addition, this specification describes the performance, functionality, and design of the UPS Service Bypass Panel, hereafter referred to as the SBP, the external Battery Systems, and connectivity solutions.
6. The UPS and associated equipment shall operate in conjunction with a primary power supply and an output distribution system to provide quality uninterrupted power for mission critical, electronic equipment load.
7. All programming and miscellaneous components for a fully operational system as described in this specification shall be available as part of the UPS.
8. Configuration Specifics UPS shall be rack/tower convertible. In rack configuration, it shall occupy no more than 6U space in standard IT Rack.

a. STANDARDS

1) EN50091-1
2) EN50091-2
3) EN55022 Class A
4) EN55024
5) EN62040- 1-1
6) EN61000-3-2, 3-3, 4-2, 4-3, 4-4, 4-5, 4-6, 4-8, 4-11
7) EN60950- 1
8) IEC60950- 1
9) GOST
10) IEC 60950
11) CE
12) VDE
13) C-tick
14) ISO 9001
15) ISO 14001

b. MODES OF OPERATION

1) Online: The input PFC power stage and the output power stage (inverter) shall operate in an on-line manner to continuously regulate power to the critical load. The input PFC stage shall be capable of full battery recharge while simultaneously providing regulated power to the load for all line and load conditions within the range of the UPS specifications.

2) On Battery: Upon failure of the AC input source, the critical load shall continue being supplied by the output power stage (inverter), which shall derive its power from the battery system. There shall be no interruption in power to the critical load during both transfers to battery operation and retransfers from battery to online operation.

3) Bypass: The bypass mode shall be used to provide transfer of critical load from the inverter output to the primary power source. This transfer, along with its retransfer, shall take place with no power interruption to the critical load. In the event of an emergency, this transfer shall be an automatic function.

4) External Service Bypass Panel (SBP): The maintenance service bypass panel shall provide power to the critical load from the bypass power source during times where maintenance or service of the UPS is required so that removal of the UPS is desired. The SBP shall provide a mechanical means of complete isolation of the UPS from the electrical wiring of the installation. The SBP shall be constructed in a free-standing, rack mounted or wall-mounted NEMA 1 enclosure unless otherwise stated in this specification. It shall be designed for single phase input with a " no break" transfer between bypass and UPS power.

c. SUBMITTALS

1) Proposal Submittals:

a) As bid system bill of materials.

b) Product catalog sheets or equipment brochures.

c) Product guide specifications.

d) System single-line operation diagram.

e) Installation information, including weights and dimensions.

f) Information about terminal locations for power and control connections.

2) Delivery Submittals:

a) Installation manual, which includes instructions for storage, handling, examination, preparation, installation, and start-up of UPS.

b) User manual, which includes operating instructions.

B. PRODUCT

a. MECHANICAL DESIGN

1) The UPS is contained in a rugged steel cabinet with two plastic front bezels;

2) The UPS dimensions are 263 x 432 x 663mm (10.4 x 17 x 26 in.);

3) The UPS cabinet is capable of conversion between Tower and Rack-Mount configurations;

b. SYSTEM CHARACTERISTICS

1) System Capacity:

a) The system is rated to be capable of supporting:

(i) 8kVA or 6.4kW whichever limit is reached first (8kVA model).

2) The UPS efficiency is at least 92% without degradation of output regulation as specified.

3) Input:

a) AC input nominal voltage: 220/230/240VAC, single phase, 3 wire (L + N + G) or 380/400/41 5VAC, three phase, 5 wire (L1+L2+L3+N+G);

b) AC input voltage window:

(i) 160 – 280VAC (L-N) at full load, while providing nominal charging to the battery system;

(ii) 100 – 280 VAC (L-N) at 50% load, while providing nominal charging to the battery system;

c) Input frequency range: 45-65Hz;

d) Input Power Factor: Minimum 0.95 lagging at 100% load at 230VAC;

e) Input Current Distortion: Maximum 6% at 100% load at 230VAC;

f) Crest factor: 3:1.

4) UPS Output:

a) AC Output Nominal Output: 200VAC, 208VAC, 220VAC, 230VAC or 240VAC, user-selectable, Single Phase;

b) Output connectors: Hardwire 3 wire (Phase + N + G), 4 IEC 320 C13 and 4 IEC 320 C19;

c) Output frequency: 50/60 +/- 3Hz tracking or 50/60 +/- 0.1Hz tracking (user selectable);

d) AC output voltage distortion: Max. 2% @ 100% linear load; Max. 5% @ 100% non-linear Load;

e) AC output static voltage regulation: +/-1%;

f) AC output dynamic voltage regulation: +/- 8% maximum for 100% load step at less than 1 0ms recovery time;

g) Overload Rating:

(i) Online: 105% - infinite; 125% - 1 minute; 150% - 30 seconds;

(ii) In bypass: Overload is limited by the upstream branch protection feeding the UPS.

h) Output Power Factor Rating: 0.2 –1.0 lagging, nominal: 0.7 lagging.

c. ENVIRONMENTAL

a) Storage Ambient Temperature: -4F to 140F (-20C to 60C).
b) Operating Ambient Temperature: +32F to 104F (0C to 40C). (77F (25C) is ideal for most battery types).
c) Relative Humidity: 0 to 95% non-condensing
d) Storage altitude: 50,000 feet (1 5000m) above sea level
e) Operating altitude: 10,000 feet (3000m) above sea level. At altitude of 10, 000 feet the UPS must be loaded up to 90% of its nominal capacity only.
f) Audible noise: less than 55dBA at 3 feet (1 m).

d. INPUT PFC POWER STAGE

1) The input PFC power stage of the UPS constantly rectifies the power imported from the mains input of the system, converting input mains AC power to DC power for precise regulation of the DC bus voltage, battery charging, and output power stage (inverter) regulated output power.

2) Input Current Total Harmonic Distortion: The input current THD_I shall be held to 6% or less at full system, while providing conditioned power to the critical load bus, and charging the batteries under steady-state operating conditions. This shall be true while supporting loads of both a linear or non-linear type. This shall be accomplished with no additional filters, magnetic devices, or other components.

3) Input Current Limit:

a) The input converter shall control and limit the input current draw from utility to 150% of the UPS output. During conditions where input current limit is active, the UPS shall be able to support 100% load, charge batteries at 10% of the UPS output rating, and provide voltage regulation with mains deviation of up to +/- 20% of the nominal input voltage.

b) In cases where the source voltage to the UPS is nominal and the applied UPS load is equal to or less than 100% of UPS capacity, input current shall not exceed 130% of UPS output current, while providing full battery recharge power and importing necessary power for system losses.

e. OUTPUT POWER STAGE (INVERTER)

1) The UPS output power stage (inverter) constantly recreates the UPS output voltage waveform by converting the DC bus voltage to AC voltage through a set of IGBT switches. In both online operation and battery operation, the output power stage (inverter) creates an output voltage waveform independent of the mains input voltage waveform. Input voltage anomalies such as brown-outs, spikes, surges, sags, and outages do not affect the amplitude or sinusoidal nature of the recreated output voltage sine wave of the output power stage (inverter).

2) **Overload Capability:** The output power stage (inverter) is capable of withstanding

150% overload for 30 seconds or 125% overload for 1 minute or 105% overload for indefinite length of time.

3) **Output Contactor:** The output power stage (inverter) is equipped with an output mechanical relay to provide physical isolation of the inverter from the critical bus. With this feature a failed inverter shall be removed from the critical bus.

4) **Battery Protection:** The inverter is provided with monitoring and control circuits to limit the level of discharge on the battery system.

f. AUTOMATIC BYPASS

1) As part of the UPS, a system automatic bypass switch is provided. The system automatic bypass shall provide a transfer of the critical load from the Inverter output to the automatic bypass input source during times when the inverter cannot support the load. Such times may be due to prolonged or severe overloads, or UPS failure. The UPS constantly monitors the output current, as well as the bypass source voltage, and inhibits potentially unsuccessful transfers to automatic bypass from taking place.

2) The design of the automatic bypass switch power path consists of a heavy-duty electromechanical bypass contactor.

3) **Automatic Transfers:** An automatic transfer of load to bypass takes place whenever the load on the critical bus exceeds the overload rating of the UPS. Automatic transfers of the critical load from bypass back to normal operation takes place when the overload condition is removed from the critical bus output of the system. Automatic transfers of load to bypass also take place if for any reason the UPS cannot support the critical bus.

4) **Manual Transfers:** Manually initiated transfers to and from bypass may be initiated through the UPS computer interface (via serial or USB communications) or by engaging the bypass switch on the rear panel of the unit.

g. BATTERY

1) The UPS battery system is comprised of user replaceable, hot swappable, battery modules. Minimum two battery modules must be installed, one providing 192VDC nominal for the positive DC bus rail, the other providing 1 92VDC nominal for the negative DC bus rail.

2) The battery jars housed within each removable battery module are of the Valve Regulated Lead Acid (VRLA) type.

3) The UPS incorporates the Intelligent Battery Management system to continuously monitor the health of each removable battery module as well as external battery modules installed in extended run battery cabinets. This system shall notify the user in the event that a failed or weak battery module is found.

4) Charging:

a) The intelligent battery management system contains a temperature monitoring circuit and compensation algorithm that regulates the battery charging current so as

to optimize battery life.

b) The battery charging circuit remains active when in bypass and online states.

5) Additional battery modules may be added to increase runtime. These modules are hot-pluggable, allowing for easy and quick installation or replacement without the need for electrical wiring, electrician services or powering down of the UPS. The number of external battery modules that may be connected to the UPS is unlimited.

6) The UPS is shipped with battery modules preinstalled but disconnected.

h. DISPLAY AND CONTROLS

1) **Control Logic:** The UPS is controlled by an embedded microcontroller which performs functions:

a) Monitoring quality of output voltage;
b) Monitoring vital parameters of the UPS;
c) Executing the state machine;
d) Intelligent battery management;
e) Remaining runtime calculation;
f) Self-diagnostics, self-test and proactive fault detection;
g) Communication to the host server via serial port;
h) Communication to the Network Interface Card or another SmartSlot accessory card if equipped.

2) Display/Control Unit: A display/control comprised of 16 LEDs and 2 pushbutton switches is located on the front side of the UPS. The display/control unit may be turned 90 degrees clockwise or counterclockwise to accommodate for the way the UPS is mounted: as a tower UPS or as a rack-mounted UPS.

3) The pushbutton switches located at the Display/Control Unit: The following controls functions can be accomplished by use of the pushbutton switches located at the Display/Control Unit:

a) Turn the UPS on;
b) Turn the UPS off;
c) Initiate self-test in order to test battery condition;
d) Silence audible alarm;
e) Cold start.
f) Displaying input RMS voltage on the battery capacity LED bar graph.

4) Bypass switch: On the rear panel of the UPS (models rated 5000VA and higher) there’s a switch that when engaged forces the UPS into bypass state provided the input voltage and frequency are within acceptable limits.

5) EPO switch: The UPS is equipped with Emergency Power Off (EPO) terminal which can be wired so as to provide means to instantaneously de-energize the UPS and its load from a remote location in case of emergency.

6) Data displayed on the Display/Control Unit: The following indicators are available on the Display/Control Unit:

a) The UPS load LED bar;
b) The UPS is online;
c) The UPS is on battery;
d) The UPS is in bypass;
e) The UPS is overloaded;
f) The UPS is in fault state;
g) The battery needs to be replaced;
h) The battery capacity/utility voltage LED bar

7) Audible Alarms: Using audio signal, the UPS will notify the user about important events. The following is the list of distinct audio alarms:

a) The UPS is on battery;
b) The UPS is on battery and the remaining battery capacity is low;
c) The UPS has shutdown due to low battery capacity;
d) The battery needs to be replaced;
e) The UPS is overloaded;
f) The UPS is in fault state;

C. PART 3 – ACCESSORIES

a. SERVICE BYPASS PANEL (SBP)

1) The service bypass panel shall provide power to the critical load from the bypass source, during times where maintenance or service of the UPS is required. The SBP shall provide a mechanical means of complete isolation of the UPS from the electrical wiring of the installation. The SBP is constructed in a free-standing, rack mounted or wall-mounted enclosure unless otherwise stated in this specification.

b. SOFTWARE AND CONNECTIVITY

1) **Network Adaptor:** SmartSlot Network Management Card shall allow one or more network management systems (NMS) to monitor and manage the UPS in TCP/IP network environments. The 8kVA unit is fitted with an UPS Network Management Card w/ Environmental Monitoring as standard.

2) Unattended Shutdown

a) The UPS, in conjunction with a network interface card, shall be capable of gracefully shutting down one or more operating systems during when the UPS is on battery mode.

b) The UPS is also capable of using an RS232 port to communicate to the host computer by means of serial communications so as to gracefully shut down one or more operating systems during an on battery situation.

c. REMOTE UPS MONITORING, CONFIGURATION AND CONTROL

1) The following three methods of remote UPS control, configuration and monitoring are available:

a) Web Monitoring: Remote monitoring, configuration and control is available via a web browser such as Internet Explorer provided the UPS is equipped with
b) Monitoring, configuration and control via PowerView Remote Display, four line multilingual intelligent alphanumeric LCD (up to 15 feet/5meters away);
c) Dry contact monitoring and control provided the UPS shall be equipped with Smart Slot Relay I/O Card.

d. SOFTWARE COMPATIBILITY

1) A: Included with the UPS is PowerChute Network Shutdown software. The software supports graceful shutdown and remote monitoring for the following systems:

a) Windows 2000 and later.
b) Linux
c) Novell Netware
d) Sun Solaris
e) AIX
f) HP-UX
g) Mac OS X

D. Part 4 - EXECUTION

a. FACTORY ASSISTED START-UP

If a factory assisted UPS start-up is requested, factory trained service personnel shall perform the following inspections, test procedures, and on-site training:

1) Visual Inspection:

a) Inspect equipment for signs of damage.
b) Verify installation per manufacturer s instructions.
c) Inspect battery modules.

2) Mechanical Inspection

a) Check all UPS and external service bypass panel internal power wiring connections.

b) Check all UPS and external service bypass panel terminal screws, nuts, and/or spade lugs for tightness.

3) Electrical Inspection:

a) Verify correct input and bypass voltage.
b) Verify correct UPS control wiring and terminations.
c) Verify voltage of all battery modules.
d) Verify neutral and ground conductors are properly landed.
e) Inspect external service bypass panel for proper terminations.

4) Site Testing:

a) Ensure proper system start-up.
b) Verify proper firmware control functions.
c) Verify proper firmware bypass operation.
d) Verify proper bypass switch operation (where applicable).
e) Verify proper inverter operation and regulation circuits.
f) Simulate utility power failure.
g) Verify proper charger operation.
h) Document, sign, and date all test results.

5) **On-Site Operational Training:** During the factory assisted start-up, operational training for site personnel shall include key pad operation, LED indicators, start-up and shutdown procedures, maintenance bypass and AC disconnect operation, and alarm information.

b. MANUFACTURER FIELD SERVICE

1) Worldwide service: The UPS manufacturer has a worldwide service organization available, consisting of factory trained field service personnel to perform start-up, preventative maintenance, and service of the UPS system and power equipment. The service organization offers 24 hours a day, 7 days a week, 365 days a year service support.

2) Replacement parts: Parts are available through the worldwide service organization 24 hours a day, 7 days a week, 365 days a year. The worldwide service organization is capable of shipping parts within 4 working hours or on the next available flight, so that the parts may be shipped to the customer site within 24 hours.

c. MAINTENANCE CONTRACTS

1) A complete offering of preventative and full service maintenance contracts for the UPS system and the battery system should be available from principal.

End of Section Uninterrupted Power System (UPS)

1. Power Distribution System

1.1. Rack Mount Power Distribution Units: (Optional)

For purposes of distributing power within an IT enclosure, rack mount power distribution units shall be available for installation within the IT enclosure. The rack mount power distribution units shall be capable of being installed in the back of the accompanying enclosure to consume zero U-space in the front of the rack, and shall not require tools for installation within the rack.

1.1.1. Input Connection:

For ease of installation, the rack mount PDU shall be connected via a twist lock connecter, and shall be capable of being fed from agency-approved flexible corded distribution wiring as described elsewhere in this Section. The input shall be capable of being served by 400Y230 volts from an L21-20 Type NEMA connector.

A hard-wired version of the product shall also be available as an option and shall be capable of being fed from a single-pole circuit breaker.

1.1.2. Output Connections:

The output of the rack mount PDU shall be fed from 230 volts, and shall be distributed to receptacles capable of supplying power to cord-connected equipment. Assuming rack mount PDU is fed from a circuit breaker with an 80 percent continuous rating, a single rack mount PDU shall be capable of distributing up to 3.2/7 kW in a single rack.

1.2. Overhead Distribution:

1.2.1. Flexible Distribution Conductors:

For purposes of overhead distribution wiring of data center branch circuits, flexible conductors of either an SJO type, or TC type shall be available as a distribution means. Flexible conductors shall be equipped with NEMA or IEC style cord caps and shall be agency-approved under UL 60950 as part of the system.

1.2.2. Cable Ladder:

For purposes of routing data and power cables between rows in a data center aisle layout, cable ladders shall be available to span the gap between rows. Cable ladders shall be agency-approved under UL 60950 as part of the system. The use of overhead cable management shall minimize the need to run data and power cable beneath a raised floor, thus minimizing potential air flow obstructions for down-flow type precision cooling solutions. This means of cable management shall also facilitate ease of installation of power and data cabling in data centers not utilizing raised floor. Optional covers shall be available for ladders as a means of adhering to local codes requiring such.

1.2.3. Cable Trough:

For purposes of routing data and power cable along the length of a row of IT enclosures in a data center environment, cable troughs shall be available as a means of separating and housing data and power cable. Optional covers shall be available for troughs as a means of adhering to local codes requiring such. The use

of overhead cable management shall minimize the need to run data and power cable beneath a raised floor, thus minimizing potential air flow obstructions for down-flow type precision cooling solutions. This means of cable management shall also facilitate ease of installation of power and data cabling in data centers not utilizing raised floor.

2. IT Server Racks

IT enclosures shall be available for housing of Owner-supplied IT equipment. Enclosures shall be listed under the same UL 60950 agency approval as other products outlined within this Section.

2.1. **General Requirements:**

a. The enclosure shall be designed to provide a secure, managed environment for computer and networking equipment.
b. The enclosure shall conform to EIA 310 and accommodate industry standard 19 inch (483 mm) rack mount equipment.
c. The enclosure shall be designed with four vertical posts to allow rack mount equipment installation utilizing four vertical mounting rails.
d. The enclosure shall be available with a vertical equipment mounting space of 42U. (1U=1 .75 inch [44.45 mm])
e. A four-post open frame configuration shall be available with 42U vertical equipment mounting space.

2.2. **Physical Requirements:**

a. External width dimensions shall be 23.5 inches (597 mm) for 19 inch (483 mm) rack enclosures, and 29.4 inches (747 mm) for 23 inch (584 mm) rack enclosure.
b. External depth dimensions shall be 42.2 inches (1070 mm).
c. Rack enclosures of a 42U design shall have a maximum external height of 81.5 inches (2070 mm) to allow passage through a standard 7 foot (2134 mm) doorway without tipping.
d. Rack enclosure shall support a dynamic load (rolling on castors) of 2000 lbs (909 kg) total weight.
e. Rack enclosure shall also be designed and manufactured to be matching in both color and construction to the UPS, PDU/system bypass and extended runtime battery enclosures to provide a uniform and consistent appearance in a data center environment.

2.3. **Equipment Access and Mounting:**

a. The enclosure shall provide 42U of equipment vertical mounting space.
b. The vertical mounting rails shall be adjustable to allow different mounting depths.
c. Front and rear doors of the enclosure shall be designed with quick release hinges allowing for easy detachment without the use of tools.

3. Cooling System

The environmental control system shall be designed specifically for precision temperature control applications. It will automatically monitor and control cooling and filtering functions for the conditioned space. The system shall be built to the highest quality engineering and manufacturing standards, and shall be floor mounted and configured for horizontal airflow, with draw-through air pattern, to provide uniform air distribution over the entire face of the coil.

1.02 **DESIGN REQUIREMENTS**

A system shall be as described in the following specification.

- COOLING TYPE: INROW PRECISION
- Total net cooling capacity: 18.2 kW.
- Sensible net cooling capacity: 18.2 kW.
- Return air dry bulb temperature: 29.4°C DB.
- Humidity: 55% RH.
- Air volume: 2900 CFM.
- Electrical supply: 230V, 50Hz, Dual Power Input

1.03 **STANDARD COMPONENTS**

A. **CABINET CONSTRUCTION**

1 Exterior panels shall be 18 gauge metal with 5 lb/ft^3 (80 kg/m^3) density foam insulation. Insulation complies with UL94-5VA ASTM E84 flame spread and smoke developed rating of 25/5 0. Front and rear exterior panels shall be 18 gauge perforated steel with 69.5% open free area, and equipped with a keyed lock to provide a means of securing access to the internal components of the unit.

2 The frame shall be constructed of 16 gauge formed steel welded for maximum strength. All units shall provide full service from the front and rear, allowing units to be placed within a row of racks.

3 All exterior panels and frame shall be powder coated for durability and attractive finish. Exterior frame and panel color shall have color values: L = 74.50, a = -.53, b = +8.20.

4 Units shall include casters and leveling feet to allow ease of installation in the row and provide a means to level the equipment with adjacent IT racks.

B. **VARIABLE SPPED DIRECT DRIVE MIXED FLOW DC FAN ASSEMBLY**

1 Fan: The unit shall be configured for draw-through air pattern to provide uniform air flow over the entire face of the coil. Each unit shall include eight 200 mm mixed flow direct drive DC axial fans. Each fan assembly should be designed to provide 362.5 CFM (171.1 l/s) for total unit airflow of 2900 CFM (1368.6 l/s).

2 Variable Speed Fans: Fans shall be variable speed capable of modulating from 30-100%. Fans shall soft start to minimize in-rush current when starting.

3 Fan Protection: Each fan assembly shall consist of a plastic injection molded bezel with integral fan discharge finger guard. Inlet of the fan should include a cage type finger guard.

4 Operation and Service: The unit should be capable of operation in the event of a fan failure. Fans shall be replaceable while the unit is in operation.

C. DUAL POWER SUPPLIES AND A-B POWER INPUT

1 Input Power Feeds: Dual A-B power inputs should be a locking NEMA or IEC plug connection suitable for the input power selected.

2 Power Supplies: The unit shall include two power supplies, each capable of running the unit at 60%

capacity in the event of a single power supply failure. Unit power consumption is not to exceed 1100 watts during normal operation.

3 Operation and Service: Power supply shall be user replaceable.

D. MICROPROCESSOR CONTROLLER

1 Monitoring and Configuration: The master display shall allow monitoring and configuration of the air conditioning unit through a menu-based control. Functions include status reporting, set-up, and temperature set points. Four LEDs report the operational status of the connected air conditioning unit.

2 Controls: The microprocessor controller shall come equipped with control keys to allow the user to navigate between menus, select items, and input alpha numeric information.

3 Alarms: The microprocessor controller shall activate a visible and audible alarm in the occurrence of the following events:

a. Internal Communications Fault
b. Link Isolation Relay Fault
c. Cooling Failure
d. Rack Inlet High Temperature
e. Air Filter Clogged
f. Lower Return Air Sensor Fault
g. Upper Return Air Sensor Fault
h. Lower Supply Air Sensor Fault
i. Upper Supply Air Sensor Fault
j. Rack Inlet Temperature Sensor
k. Coil Fluid Valve Actuator Fault
l. Fan Fault
m. Water Detection Fault
n. Condensate Pump Fault
o. Fluid Flow Meter Failure
p. Entering Fluid High Temperature
q. Entering Fluid Temperature Sensor
r. Leaving Fluid Temperature Sensor
s. Condensate Pan Full Alarm
t. Power Feed Failure
u. Fan Power Supply Fault
v. Air Filter Run Hours Exceeded
w. RACS Air Pressure High
x. Supply Air High Temperature

y. Return Air High Temperature

z. Group Communications Lost aa.

Filter Sensor Fault

ab. RACS Pressure Sensor Fault

4 **Logging:** The microprocessor controller shall log and display all available events. Each alarm log shall contain time/date stamp as well as operating conditions at the time of occurrence. Controller shall display the run time hours for major components.

E. NETWORK MANAGEMENT CARD

The unit shall include a network management card to provide management through a computer network through TCP/IP. Management through the network should include the ability to change set points as well as view and clear alarms.

F. COOLING COIL AND CONDENSATE PAN

1 Cooling coil shall use raised lance type aluminum fin and 3/8 inch OD (9.5 mm) copper tube coils. Coil end supports shall be a minimum 18 gauge galvanized steel. Coil shall be rated for a maximum pressure of 400 psig (2757.9 kPa).

2 The unit shall consist of a primary and secondary drain pan. Secondary drain pan shall be piped to primary pan for removal of condensate. Primary drain pan shall include a condensate pump and dual floats for control and overflow protection. Condensate pans are V-0 thermal formed, anti-fungal, non-ferrous material for higher indoor air quality.

G. 2-WAY/3-WAY FLOATING POINT VALVE

1 Chilled water system shall utilize a three-way valve to regulate the amount of chilled water to the cooling coil to maintain desired conditions. Unit shall be equipped with a manual shut-off to close the by-pass leg for field configuration of 2-way or 3-way operation. Valve shall be piped internally with unions to allow for easy replacement in the field. The standard valve pressure rating shall be 600 psig.

2 Valve Actuator: Actuator shall be direct connect rotary floating point style actuator and should be capable of being replaced without disconnecting piping from the valve.

H. CONDENSATE PUMP

Factory Installed and wired condensate pump shall pump 1.3 gal/h (5.9 liters/hour) at 16 ft (4.9 m) of lift and a 50 ft (15.2 m) horizontal run.

I. FILTERS

1 Standard Air filter: <20% efficient per ASHRAE 52.1, MERV 1 per ASHRAE 52.2, 1/2” washable mesh filter

2 Optional Air filter: High capacity 2” pleated, UL 900 Class 2, Moisture with average atmospheric dust spot efficiency of 30% per AHRAE Standard 52.1, MERV 8 per ASHRAE 52.2

J. SELECTABLE TOP OR BOTTOM PIPING

1 Pipe connections for field connection from either the top or bottom of the unit. Unit

connections shall be made internal to the unit.

2 Pipe adapter: The unit shall include two pipe adapters that convert a 1 in (25.4 mm) NPT to a 1 in (25.4 mm) BSPT (manufactured in accordance with BS21). Pipe adapters shall ship loose with the unit for field installation where applicable.

K. REMOTE TEMPERATURE SENSOR

Remote temperature sensor shall ship factory wired to the unit for placement in the field to provide control input based on rack inlet temperature.

L. FLOW METER

Flow meter shall be factory piped inside the unit and connected to microprocessor controls to provide water flow rate through the unit. The microprocessor controller shall also use this information to provide total unit capacity out of the unit while in operation.

M. CABLE WATER DETECTOR (OPTIONAL)

1 A leak detection sensing cable shall be shipped loose with the unit. If water or other conductive liquids contact the cable anywhere along its length, the main controller visually and audibly annunciates the leak.

2 The detector shall be provided with a 20 ft (6.1 m) of cable. Cable may be cascaded up to 80 ft (24.4 m).

N. BRIDGE POWER CABLE TROUGH

Overhead power distribution bridge between adjacent NetShelter racks that allows for removal of the unit without disrupting the overhead power cabling.

O. BRIDGE DATA PARTITION

Overhead cable distribution between adjacent racks that allows for removal of the unit without disrupting overhead cabling.

1.02 CHILLED WATER

The unit shall be piped in accordance with the highest commercial quality procedures. All pipe forming shall be tool bent with the proper bend radii to prevent flattening in the curve. The chilled water piping shall be insulated with closed neoprene thermal insulation. All piping connections should be made at the rear of the unit for top or bottom accessibility.

Environment Monitoring & Surveillance

This specification describes the features of integrated security and environment monitoring system (ISEMS). The ISEMS shall be a centralized appliance with a client console. It also included sensor pods for environmental temperature and humidity monitoring.

The system must have following specifications,

a. Equipment Support

b. Up to 12 sensor pods

c. Physical Dimensions

d. Weight:1.74 Kg

e. Height: 114 mm, Width: 527 mm, Depth:163 mm

f. Operating Conditions

g. Temperature: 0-45 C

h. Humidity: 0-95 % RH Non Condensing

i. Approvals

j. AS/NZS 3548 (C-Tick) Class A

k. cUL Listed

l. CE

m. FCC Part15 Class A

n. GOST

o. ICES-003 IRAM

p. Low Voltage Directive 2006/95/EC NOM

q. VCCI Class A

Chiller

Air Cooled, Electric chillers are required for supply of chilled water for InRow Cooling units. Chillers should meet following specifications;

a. Type: Air Cooled, Electric Chiller
b. Voltage: 230/400 V
c. Frequency: 50 Hz
d. Capacity: 25 kW ± 5% at 45 C DB temperature
e. Altitude: 600 meters
f. Supply Water Temperature: 7.2 C

g. Return Water Temperature: 12.7 C
h. Flow Rate: 14 GPM Minimum
i. Refrigerant: R410A or R407C
j. EER: 3.75 or Above
k. Compressor: Hermetic Scroll
l. Certification: Euro vent Certified
m. Country of Origin: USA or EU
n. Control: Microprocessor Based
o. Minimum Working Capacity: 30% of full load

Chilled Water Piping System

Chilled water piping is required between chillers and InRow units. Piping should be seamless steel piping of schedule 40 or L type copper piping. Piping should include all kind of fittings including but not limited to valves, bends, strainers, insulation, pumps, flow meters, purging valves etc. It should be complete in all respect in accordance with chiller and InRow cooling unit operational requirements. Chillers & InRow cooling unit data must be consulted and well understood before undertaking any installation works.

Pipe sizes should be calculated on chilled water flow rate, velocity and piping equivalent distance between chiller and InRow cooling units. International standards should be observed while designing and installation of complete system.

Appropriate size chiller water pump should be incorporated with each chiller to maintain required flow rate and head pressure. All design calculations and drawings must be consulted and approved from relevant principals before installation.

Chilled water tank and pressure tank should be provided with piping system. A 20 mesh Steiner must be provided in piping system before InRow Cooling units. Complete system should be tested for any kind of leakage for at least 24 hours. Drip tray should be provided within data center room for early detection of condensate or leakage.

Chiller must be installed on foundation or steel base as per manufacturer

recommendations. **ANNEXUR "B"**

Central Block Wise UPS

Part 1 GENERAL

1.1. SUMMARY

A. This specification describes a three-phase, on-line, continuous operation, solid-state uninterruptible power supply (UPS). The UPS shall operate as an active power control system, working in conjunction with the building electrical system to provide power conditioning and on-line power protection for the critical loads.

1.2. DESCRIPTION

A. The UPS shall consist of the following easy to repair modular rectifier/inverter sections and easy to install internal and external modular battery units.

B. The UPS shall be provided with separate feeds for rectifier/inverter section and the static bypass switch.

C. Modes of operation: The UPS shall operate as an on-line system in the following modes:

i. *Normal:* The inverter and the rectifier shall operate in an on-line manner to continuously regulate the power to the critical load. The rectifier shall derive power from the AC input source and supply DC power to float charge the battery.

ii. *Battery:* Upon failure of the AC input source, the critical load shall continue being supplied by the main inverter without any switching. The inverter shall obtain its power from the battery. There shall be no interruption in power to the critical load upon failure or restoration of the AC input source.

iii. *Recharge:* Upon restoration of the AC input source, the UPS shall simultaneously recharge the battery and regulate the power to the critical load.

iv. *Bypass:* The static bypass switch shall be used for transferring the critical load to input supply without interruption. Automatic re-transfer to normal operation shall also be accomplished with no interruption in power to the critical load. The static bypass switch shall be fully rated and shall be capable of manual operation. The UPS shall be able to recharge the batteries while supplying full power to the load via the static bypass switch.

v. *Internal maintenance bypass:* The UPS shall be provided with an internal manual bypass to simplify the installation and shall be used for supplying the load directly from the mains supply, while the UPS is taken out for maintenance.

vi. *External maintenance bypass [optional]:* The external maintenance bypass switch shall be used for supplying the load directly from the mains supply, if the UPS is to be replaced. An UPS input, output, and bypass switch shall be housed in the same low-voltage assembly. The bypass switch must be monitored by the UPS via an auxiliary contact. The maintenance bypass must be housed in a wall mounted low-voltage assembly that complements the appearance of the UPS.

D. The UPS shall be provided with RS-232 signalling and WEB/SNMP integration. This system must provide a means for logging and alarming of all monitored points plus email notification.

E. The UPS shall have nominal voltage of 3400/230V (adjustable for 3380/220V, 3415/240V), 50Hz 3 and 4-wire + earth configurations.

F. The UPS shall be compatible with all types of data centers, data rooms and facilities. Dedicated service to one specific environment shall not be acceptable.

1.3. STANDARDS

A. Safety: EN50091-1-1 / IEC 62040-1-1
B. Emissions: EN5 009 1-2/IEC 62040-2
C. Performance: EN/IEC 62040-3
D. IEC 6 1000-3-2
E. IEC 6 1000-3-3,

1.4. CLASSIFICATION

A. Classification according to EN/IEC 62040-3: VFI-SS-1 12

1.5. SUBMITTALS

A. Proposal Submittals

i. Bid system bill of materials
ii. Product catalogue sheets or equipment brochures
iii. Product guide specifications
iv. System single-line operation diagram
v. Floor layout
vi. Capacity data
vii. Piping connection drawing
viii. Installation guide
ix. Drawings for requested optional accessories

B. **Delivery Submittals**

i. Installation manual, which includes instructions for storage, handling, examination, preparation, installation, and start-up of all systems.
ii. User manual, which includes operating instructions.
iii. As built equipment drawings.
iv. InfraStruXure Welcome Package.

1.6. QUALIFICATIONS

A. **Manufacturer experience:** The manufacturer shall have a minimum of 20 years experience in the design, manufacture, and testing of UPS and cooling systems.

B. **ISO 9001 Certification:** The manufacturer shall be ISO 9001 & 14001 certified. Certification assures that the vendor's quality control & environmental measures have been certified by an accredited registrar and meet internationally recognized standards.

1.7. ENVIRONMENTAL REQUIREMENTS

A. **Storage ambient temperature:** –50°C to 40°C

B. **Operating ambient temperature:** 0°C to 40°C. 15°C to 25°C is ideal for batteries (above the battery lifetime is reduced).

C. **Relative humidity:** 0 to 95%, non-condensing.

D. **Storage elevation:** 0 to 1 5000m.

E. **Operating altitude with no derating:** 0 to 1000m feet above sea level.

Part 2

P R O D U C T

2.1. STATIC UPS

A. GENERAL

i. The UPS shall be housed in a free standing enclosure. The enclosure shall be designed to blend into an IT environment. The cabinet shall be equipped for fork truck lifting. The UPS cabinet shall be painted with the manufacturer's standard color, black. All service and installation access shall be from the front and top

ii. The UPS shall be in a self contained cabinet and comprise 1 0kVA, 1 5kVA, 20kVA, 30kVA or 40kVA power section; Bypass Static Switch; Battery for standard run time and interface LCD display all mounted in a separate cabinet. The UPS shall permit user installable and removable battery units. The power section shall be of the Double Conversion On-Line topology with power factor corrected inputs.

1. The UPS shall be sized for_____kVA and _____ kW load.
2. The UPS battery shall be sized for_____ at a power factor of____ for _____minutes.

iii. The UPS shall have a short circuit withstand capability of 30kA

B. **SYSTEM** INPUT

i. **Nominal Input voltage rating:** 3 ×400/230V (adjustable for 3 ×380/220V or 3 ×4 1 5240V)

ii. **Input Voltage range:** 304-477V

iii. **Earthing principle:** [TN-S] [TN-C-S] [TN-C] [TT] or [IT].

iv. **Input frequency:** 40-70 Hz (auto sensing)

v. **Input power factor:** 0.98

vi. **Magnetizing inrush current:** NONE, if optional input isolating transformer is installed then 500% of nominal input current for less than one cycle

vii. Input current distortion with no additional filters:

viii. < 5% THD at 100% load

ix. **Power walk-in/Soft-Start:** Shall be linear from 0 to 100% of the load over a 1 5-second period

C. SYSTEM OUTPUT

i. **Nominal Output voltage rating:** 3×400/230V.

ii. Earthing principle: [TN-S] [TN-C-S] [TN-C] [TT] or [IT].

iii. Output voltage regulation for steady state and transient variations (at default parameter settings):

1. ± 1% steady state for a static 100% balanced load.
2. ± 1% steady state for a static 100% unbalanced load.
3. ± 5% for a 0 to 100% load step.

iv. **Max. voltage transient recovery time:** 50 milliseconds to nominal.

v. Output frequency regulation:

1. Synchronised to mains over the range of 47-53Hz or 57-63Hz in normal operation
2. 50 Hz ± 0.1 Hz in battery operation.

vi. Output voltage harmonic distortion:

1. <2% THD maximum and 1% single harmonic for a 100% linear load
2. <5% THD maximum for a 100% non-linear load

ii. Overload capability:

1. 150% for 30 seconds in normal operation.
2. 110% continuous in bypass operation
3. 800% for 500 milliseconds in bypass operation

Phase displacement:

1. 20 degrees ± 1 degree for balanced load.
2. 20 degrees ± 1 degree for 50% unbalanced load.
3. 20 degrees ± 3 degrees for 100% unbalanced load.

ix. **Output Power Factor Rating:** For loads exhibiting a power factor of 0.5 leading to 0.5 lagging, no derating of the UPS shall be required.

x. **Short circuit withstand:** The UPS must withstand a bolted-fault short circuit on the output without damage to the UPS module.

xi. System AC-to-AC efficiency 100% load

1. 10kVA 95.7%
2. 15kVA 95.7%
3. 20kVA 95.3%
4. 30kVA 94.6%
5. 40kVA 96.0%

xii. System AC-to-AC efficiency 50% load

1. 10kVA 94.1%
2. 15kVA 95.7%
3. 20kVA 95.7%
4. 30kVA 94.6%
5. 40kVA 96.5%

xiii. **Acoustical noise:** dB(A) of noise, typically, measured at 1 meter from the operator surface:

1. 1 0kVA 64
2. 15kVA 64
3. 20k VA 67
4. 3 0k VA 67
5. 40k VA 67

i. Rectifier

1. Each UPS power module shall include an active power factor corrected, Insulated Gated Bipolar Transistor (IGBT) rectifier.
2. DC buss voltage shall be ±192Vdc nominal.
3. The battery charging shall keep the DC bus float voltage of +/- 220v, +/-1%
4. The DC buss voltage shall be compensated against temperature variations (Battery Temperature Compensation) to always maintain optimal battery float charging voltage for temperature excursions above or below 25°C. Temperature compensation rate shall be 320mV/°C for ambient temperatures > 20°C and 0mV/°C for ambient temperatures < 20°C.
5. DC ripple voltage shall be less than ±1% of nominal with no battery connected.
6. Input power factor shall be 0.98 lagging at 100% load with out the use of passive filters. Rectifier shall employ electronic waveform control technology to maintain the current sinusoidal.
7. Pulse Width Modulation (PWM) current control shall be used. Digital Signal Processors (DSP) shall be used for all monitoring and control tasks. Analog control is not acceptable.
8. Reflected input current Total Harmonic Distortion (THD) shall not exceed 5% at 100% load.
9. Input voltage window: 304-477 V.
10. Typical battery recharge time per IEEE 485.

ii. Batteries

1. Standard battery technology shall be Valve Regulated Lead Acid (VRLA).
2. Batteries shall be housed in the same rack as the power section. Batteries shall be modular on pull out shelves for quick replacement and servicing.
3. Battery voltage shall be Battery Temperature Compensated as outlined in the rectifier section above.
4. End of discharge: ±160Vdc.
5. For longer runtimes, external battery frames in the same design should be offered.
6. Battery Charge Current Limit: The UPS shall be capable of limiting the energy sourced from the mains for purposes of battery charging. As a default setting, the battery charge energy will be set to 100% of its nominal value. When signaled by a dry contact, (such as from an emergency generator) the UPS shall be capable of limiting the battery charge energy taken from the mains. This shall take place in user selectable increments of 75%, 50%, 25%, 10% and 0% of the nominal charge power. The selection shall be made from the UPS front panel display/control unit.
7. The battery charging circuit shall remain active when in Static Bypass and in Normal Operation.

Inverter

1. The inverter shall consist of fast switching IGBT power module.
2. Inverter shall be PWM controlled using DSP logic. Analog control shall not be acceptable.
3. The inverter modules shall be rated for an output power factor at 0.8.
4. Nominal output voltage shall be 3×400/230V and adjustable for 3×380/220V or 3×415240V, 50Hz, L1,L2,L3,N,PE.

5. Efficiency of each module at full load: Not less than

- 10kVA 94.7%
- 15kVA 94.7%
- 20k VA 94.7%
- 30kVA 94.5%
- 40k VA 94.8%

6. Output Voltage Total Harmonic Distortion at full load:

- Less than 2% for 100% resistive load.
- Less than 5% for computer load as defined by EN50091-3/IEC 62040-3.

7. Output voltage regulation

- Static: Less than 1% at full linear load.
- Dynamic: 5% at 100% step load.

8. Output frequency: 50Hz free running.

9. **Crest factor:** Unlimited but regulates it down to 2.7.

a. Remote Emergency Power Off (EPO) shall be standard (wall switch and wiring shall be provided by the electrical contractor).

iv. Static Bypass Switch

1. The static switch shall consist of fully rated Silicon Controlled Rectifiers (SCRs). Part rated SCRs with a wrap around contactor are not acceptable.
2. The static bypass switch shall automatically transfer the critical load to bypass input supply without interruption after the logic senses one of the following conditions:
    - Inverter overload beyond rating.
    - Battery runtime expired and bypass available.
    - Inverter failure.
    - Fatal error in control system.
3. The static bypass switch shall automatically retransfer from bypass to the inverter, when one of the following conditions occurs:
    - After an instantaneous overload-induced transfer has occurred and the load current has returned to less than 100% of the system rating.
    - The inverter is active (on).
4. The static bypass switch shall be equipped with a manual means of transferring the load to bypass and back to inverter.
5. If more than 10 transfers from and to inverter occur in a 10 minutes period, the load shall be locked on static bypass. An alarm communicating this condition shall be annunciated.

E. MECHANICAL

i. AIS3000

1. The AIS3 000 UPS power section, Static Bypass Switch, internal manual bypass switch and the VRLA batteries (for standard runtimes) shall be housed in a free standing enclosure. The enclosure shall be designed to blend into an industrial environment. The cabinet shall be equipped for fork truck lifting. The UPS cabinet shall be painted with the manufacturer's standard colour (ANSI 61). All service access shall be from the front. The enclosure shall have the following specifications:
    - Dead front construction
    - Caster fitted for mobility. Leveling feet shall be supplied as standard.
    - The cable entry shall be from the bottom on the back of the UPS.
    - The AIS3 000 UPS enclosure shall meet an ingress level of min. IP2 1
    - The AIS3000 UPS should be fitted with air filter in the front.

ii. UPS

1. The UPS power section, Static Bypass Switch, internal manual bypass switch and the VRLA batteries shall be housed in a free standing enclosure in a matching black color having the following specifications:
    - Colour finish. Black
    - Dead front construction
    - Caster fitted for mobility. Leveling feet shall be supplied as standard.
    - The cable entry shall be from the bottom on the back of the UPS.
    - The UPS enclosure shall meet an ingress level of min. IP20.

iii. **UPS module dimensions:** HeightWidthDepth

[Choose one, depending on UPS kVA and required backup time:]

10 KVA	1490×352×928
15 KVA	1490×352×928
15 KVA	1490×523×928
30 KVA	1490×523×928

F. 2.9 **DISPLAY, CONTROLS AND ALARMS**

i. A microprocessor controlled display unit shall be located on the front of the system. The display shall consist of an alphanumeric display with backlight, an alarm LED, and a keypad consisting of pushbutton switches.

ii. The following metered data, shall be available on the alphanumeric display:

1. Year, Month, Day, Hour, Minute, Second of occurring events
2. Input AC Voltage
3. Output AC voltage
4. Output AC current
5. Input Frequency
6. Battery voltage

7. Highest Internal Battery temperature

The display unit shall allow the user to display an event log of all active alarms and of the 64 most recent status and alarm events. The following minimum set of alarm conditions shall be available:

1. Static bypass switch on
2. EPO Active
3. Mechanical bypass activated
4. External bypass switch (Q3) activated
5. Battery discharged
6. Return from low battery
7. Low battery
8. Load not powered from UPS
9. UPS in bypass
10. Runtime calibration aborted
11. Runtime calibration started
12. Runtime calibration complete
13. Battery self test aborted
14. Battery self test started
15. Battery self test completed
16. Number of battery modules decreased
17. Number of battery modules increased
18. Fan fault
19. SBS fault
20. System not in sync.
21. Bypass not available, frequency/voltage out of range
22. Mains voltage/frequency out of range
23. Site wiring fault
24. Low battery voltage shut down
25. XR battery breaker or fuse open

26. Defective battery detected
27. Runtime is below alarm threshold
28. Load is above alarm threshold
29. Battery over-voltage warning
30. Battery over-temperature warning
31. Emergency power supply fault
32. Output overloaded

iv. The following controls or programming functions shall be accomplished by use of the display unit. Pushbutton membrane switches shall facilitate these operations.

1. Silence audible Alarm
2. Set the alphanumeric display language
3. Display or set the date and time
4. Enable or disable the automatic restart feature
5. Transfer critical load to and from static bypass
6. Test battery condition on demand
7. Set intervals for automatic battery tests
8. Adjust set points for different alarms
9. Program the parameters for remote shutdown.

v. The following shall make up the UPS front panel user interface.

1. Indicating LED's
   - Load On When Green, this LED indicates the load is being supported by the UPS output
   - On Battery When Yellow, this LED indicates the UPS is running from Battery power
   - Bypass When Yellow, this LED indicates the load is being supported by static bypass/mechanical bypass
   - Fault When Red, this LED indicates there is a fault condition present in the UPS.
2. Push Button User Controls
   - Up Arrow
   - Down Arrow
   - Help Key
   - Escape Key
   - Enter Key

vi. Potential Free (Dry) Contacts

1. The following potential free contacts shall be available on an optional relay interface board:
   - Normal Operation
   - Battery Operation
   - Bypass Operation
   - Common Fault

- Low Battery
- UPS Off

vii. For purposes of remote communications with the UPS the following shall be available and contained within the UPS on a removable, “hot swappable” “smart slot” interface card:

1. RJ-45 Interface port for remote communications with a network via web browser or SNMP.

2. Environmental monitoring feature, capable of locally monitoring temperature and humidity as well as one additional generic set of user determined dry contacts capable of taking an input signal from any third party on/off signal, such as water detection, smoke detection, motion, or fire detection.

G. BATTERY

i. The UPS battery shall be of modular construction made up of user replaceable, hot swappable, fused, battery modules. Each battery module shall be monitored to determine the highest battery unit temperature for use by the UPS battery diagnostic, and temperature compensated charger circuitry.

ii. The battery blocks housed within each removable battery module shall be of the Valve Regulated Lead Acid (VRLA) type.

Part 3 ACCESSORIES

A. EXTENDED RUNTIME (XR) OPTION

i. For purposes of extending the UPS battery runtime, external extended runtime options shall be available. The extended runtime option shall be housed in “line up and match” type enclosures and shall contain necessary hardware and cables to connect to the UPS, or between XR enclosures. Each XR enclosure shall be equipped with removable, hot swappable, battery units housed in draw-out cartridges.

ii. The extended runtime system shall have a 250 VDC rated, thermal magnetic trip molded case circuit breaker. Each circuit breaker shall be equipped with shunt trip mechanisms and 1A/1B auxiliary contacts. The circuit breakers are to be equipped as part of a line-up-and-match type battery enclosure.

3.2 **SERVICE BYPASS PANEL (SBP)**

i. The service bypass panel shall provide power to the critical load bus from the bypass source, during times where maintenance or service of the UPS is required. The SBP shall provide a mechanical means of complete isolation of the UPS from the electrical wiring of the installation. The SBP shall be constructed in a free-standing or wall-mounted IP20 enclosure unless otherwise stated in this specification.

ii. As a minimum, the SBP shall contain the following features and accessories:

1. Switches of the appropriate size and withstand rating (30 kA), for the system.

2. Minimum 1 NO/NC auxiliary contact for the purpose of relaying status information of the manual maintenance bypass switch to the UPS in order to make sure that the UPS will go/be in static bypass operation so the UPS is not damaged.

3. The SBP shall be CE marked according to at least EN/IEC60439.

B. SOFTWARE AND CONNECTIVITY

i. The Ethernet Web/SNMP Adaptor shall allow one or more network management systems (NMS) to monitor and manage the UPS in TCP/IP network environments. The management information base (MIB) shall be provided in DOS and UNIX "tar" formats. The SNMP interface adaptor shall be connected to the UPS via the RS232 serial port on the standard communication interface board.

ii. Unattended Shutdown

iii. The UPS, in conjunction with a network interface card, shall be capable of gracefully shutting down one or more operating systems during when the UPS is on reserve mode.

iv. The UPS shall also be capable of using an RS232 port to communicate by means of serial communications to gracefully shut down one or more operating systems during an on battery situation.

C. **REMOTE UPS MONITORING**

i. The following three methods of remote UPS monitoring shall be available:

1. Web Monitoring: Remote monitoring shall be available via a web browser such as Internet Explorer.

2. RS232 Monitoring: Remote UPS monitoring shall be possible via either RS232 or contact closure signals from the UPS.

3. Simple Network Management Protocol (SNMP): Remote UPS Monitoring shall be possible through a standard MIB II compliant platform.

D. SOFTWARE COMPATIBILITY

i. The UPS manufacturer shall have available software to support graceful shutdown and or remote monitoring for the following systems:

- a. Microsoft Windows 95/98/XP
- b. Microsoft Windows NT 4.0 SP6/2000

- c. OS/2
- d. Netware 3.2 – 5.1
- e. MAC OS 9.04, 9.22, 10
- g. Digital Unix/True 64
- h. SGI 6.0-6.5
- j. SCO UNIX
- k. SVR4 2.3, 2.41
- m. SCO Unix Ware 7.0 - 7.11
- n. SUN Solaris 2.6-2.8
- o. SUN OS 4.13, 4.14
- p. IBM AIX 4.3x-4.33g, 5.1
- q. HP-UX 9.x-11.i

Part 4 EXECUTION

A. FACTORY ASSISTED START-UP

If a factory assisted UPS start-up is requested, factory trained service personnel shall perform the following inspections, test procedures, and on-site training:

A. **Visual Inspection:**

Inspect equipment for signs of damage.
Verify installation per manufacturer's instructions.

Inspect cabinets for foreign objects.

Inspect Battery Units.

Inspect Power Module(s).

B. Mechanical Inspection:

1. Check all UPS and external maintenance bypass cabinet internal power wiring connections.
2. Check all UPS and external maintenance bypass cabinet terminal screws, nuts, and/or spade lugs for tightness.

C. Electrical Inspection:

1. Verify correct input and bypass voltage.
2. Verify correct phase rotation of all mains connections.
3. Verify correct UPS control wiring and terminations.
4. Verify voltage of all battery modules.
5. Verify neutral and ground conductors are properly landed.
6. Inspect external maintenance bypass switch for proper terminations and phasing.

D. Site Testing:

1. Ensure proper system start-up.
2. Verify proper firmware control functions.
3. Verify proper firmware bypass operation.
4. Verify proper maintenance bypass switch operation.
5. Verify system set points.
6. Verify proper inverter operation and regulation circuits.
7. Simulate utility power failure.
8. Verify proper charger operation.

9. Document, sign, and date all test results.

E. On-Site Operational Training: During the factory assisted start-up, operational training for site personnel shall include key pad operation, LED indicators, start-up and shutdown procedures, maintenance bypass and AC disconnect operation, and alarm information.

A. Worldwide service: The UPS manufacturer shall have a worldwide service organization

Available, consisting of factory trained field service personnel to perform start-up, preventative maintenance, and service of the UPS system and power equipment. The service organization shall offer 24 hours a day, 7 days a week, 365 days a year service support.

B. Replacement parts: Parts shall be available through the worldwide service organization 24 hours a day, 7 days a week, 365 days a year. The worldwide service organization shall be capable of shipping parts within 4 working hours or on the next available flight, so that the parts may be delivered to the customer site within 24 hours.

4.3 **MAINTENANCE CONTRACTS**

A complete offering of preventative and full service maintenance contracts for the UPS system and the battery system shall be available. All contract work shall be performed by factory trained service personnel.

4.4 **TRAINING**

UPS service training workshop: A UPS service training workshop shall be available from the UPS manufacturer. The service training workshop shall include a combination of lecture and practical instruction with hands-on laboratory sessions. The service training workshop shall include instruction about safety procedures, UPS operational theory, sub-assembly identification and operation, system controls and adjustment, preventative maintenance, and troubleshooting.

Electrical Power Distribution System

a. PESSI intends to use a central UPS for each building block. Devices are marked on floor plan those would be required to be powered up from central UPS. UPS rating should also be calculated and approved based on devices load marked in each block. UPS rating shall be between 15 -30 KVA.

b. Three phase electrical power distribution system is required for UPS power distribution to final devices including desktop computers, switches etc. Load on each phase should be balanced.

c. Electrical power distribution should be in accordance with national laws and best industry practices.

d. LV Power distribution system shall include power distribution boards, cables, sockets, cable conduits, cable trays etc. It should be complete in all respects so that end devices can be power up without any additional equipment.

e. Cables should be 99.99% pure copper and PVC/PVC insulated. Cable sizes should be calculated based on circuit load requirement, ambient temperature, laying method, length of cable etc. Final selection should be approved before implementation and design calculations should also be approved for competent authority.

f. Switch gear used should be A class and of European origin. Distribution boards should be made of 14 SWG MS sheet and powdered coated to house switchgear. They must have metering devices like indication lights, digital voltmeter, ammeters, CT etc with branch circuit protection. Switch boards must have 1.5- 2 KV electrical isolation.

Annexure "D"

Note Following to be submitted with Technical Bid on Judicial Stamp Paper of Rs.: 100/-

Certificate

I _____On behalf of M/s

do hereby declare that:

1. The Firm mentioned above is a bonafide firm registered and engaged in the business of Computer / Server equipment in Pakistan under Law of land.
2. That the Firm has not been declared Bankrupt and has a reasonable capital for supply of the equipment for which bid is being submitted.
3. That the Firm has not been declared as "defaulter" by any Government Department in Pakistan on any ground whatsoever except that the decision has been set by competent authority or court of Law.
4. That the Firm has not been punishment by any court of law on any ground whatsoever except the decision has been set aside by competent authority or Superior Courts.
5. That the Firm has not been declared as "Black Listed" by any Government Department in Pakistan except the decision has been set aside by competent authority or court of Law.
6. That all the above declarations are correct and based on facts.
7. That if any of the above certificate proven fake PESSI reserve the fight to take appropriate action.

Name

Designation/Stamp